



# **Cycling in vehicle restricted areas**

**Prepared for Charging & Local Transport Division,  
Department for Transport**

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## Executive Summary

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Vehicle restricted areas (VRAs) are those areas of the highway where access for vehicles is heavily restricted, usually to provide a more comfortable environment for pedestrians. They are often shopping streets in town centres. Most people would probably call them 'pedestrian areas' but certain vehicles are often permitted for a range of reasons. The restrictions on the types of vehicle that can enter and the hours of the restrictions vary from site to site.

This report describes a study into the use of VRAs by cyclists where cycling is permitted but other vehicles are not. In particular, the sharing of space by pedestrians and cyclists has been examined, from both a physical and an attitudinal perspective. The aim is to provide factual information on behaviour and attitudes that will assist practitioners with what can be a contentious issue.

Detailed research was undertaken in three cities – Cambridge, Hull and Salisbury. This comprised a mixture of observation surveys (video monitoring and manual speed surveys) and interviews with pedestrians and cyclists. In addition, TRL investigated the VRAs in a further nine towns and held discussions with various local authorities and other interested parties.

The observation surveys provided data on 2,220 cyclists. It was shown that pedestrian flow, regulations, the types of cyclist and the characteristics of the site influenced dismounting and cycling speeds. The majority of cyclists tended to slow down or dismount and push their bicycles when pedestrian flows were high. However, a minority (mostly young males) continued to cycle quite fast.

The interviews, with 300 pedestrians and 150 cyclists, showed that a majority of pedestrians said that they were 'not bothered' by cyclists using the VRA. However, a number of people had witnessed collisions between cyclists and pedestrians in the VRA and a majority of pedestrians at two of the three sites said that they would like to see cyclists excluded for at least part of the day. Pedestrians were least concerned about cyclists using the VRA at the site where flows of cyclists were lowest. Many people said that they would favour segregation of cyclists and pedestrians. However, there are too few examples of segregation in VRAs for this view to have a firm basis in direct experience.

The report provides examples of VRAs with different physical designs and offers some conclusions on which features appear to allow sharing most satisfactorily. In particular, it recommends that street furniture should be arranged to channel cyclists away from doorways and that areas intended exclusively for pedestrians should be indicated by kerbs or other means. There is also scope for improving the public's understanding of the road signs used in VRAs. The authors conclude that sharing is not an ideal solution, either for pedestrians or cyclists, but that it may be an appropriate compromise in terms of trying to meet sustainable transport objectives. The relative risks and benefits to both user groups will need to be assessed. These will depend on local circumstances.

This study does not address the general issue of shared use by cyclists and pedestrians. Other types of shared-use facility, such as countryside trails or converted footways, have quite different characteristics and the results and conclusions are not necessarily transferable.



# 1 Introduction

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## 1.1 Vehicle restricted areas

This report presents the findings of a study of cycling in vehicle restricted areas for the Department for Transport (DfT). Vehicle restricted areas (VRAs) are those areas of the highway where access for vehicles is heavily restricted, usually to provide a more comfortable environment for pedestrians. These are usually shopping streets in town centres. The lay person would probably call them 'pedestrian areas'. The restrictions on the types of vehicle that can enter and the hours of the restriction will vary from site to site.<sup>1</sup>

Most towns or cities in the UK now contain areas in which some form of restriction applies to vehicular traffic. Most commonly these will be pedestrianised shopping streets, although roads may also be closed to traffic for a range of safety and heritage reasons. All of these areas will have a prohibition affecting through-traffic, but arrangements for loading and unloading will often permit goods vehicles, possibly at certain times only.

The treatment of cyclists in VRAs varies throughout the country. In some cases, there is a complete ban on cycling, but in others, cyclists may pass through without restriction.

## 1.2 Previous research

The issue of cyclists and VRAs has been investigated in two previous TRL studies for the DfT.

Trevelyan and Morgan (1993) videoed cyclists using pedestrian areas in towns in the UK and mainland Europe. They also interviewed pedestrians and cyclists in these areas. They concluded that pedestrians change their behaviour in the presence of motor vehicles but not in response to cyclists. Cyclists, however, respond to pedestrian density, moderating their speed, dismounting, and taking other avoiding action when necessary. Accidents between pedestrians and cyclist were very rarely generated (according to police accident statistics): only one pedestrian-cyclist accident was recorded in 15 site years in the sites studied. The authors concluded that cyclists should be permitted to use pedestrian areas rather than be forced onto more dangerous alternative routes. However, this conclusion has been criticised by pedestrians' representatives as giving insufficient weight to the views expressed by pedestrians in the survey, many of whom felt uncomfortable about cyclists using pedestrian areas.

Davies *et al.* (1998) investigated routes used by cyclists to avoid pedestrian areas in nine towns in the UK. In three towns, designated routes had been provided to enable cyclists to avoid the pedestrian area. However, in most other towns, cyclists were forced to use routes that were much more

hazardous and inconvenient. Interviews with cyclists showed that many cyclists used both the pedestrian areas and the alternative routes, depending on time of day, pedestrian density, the need to make stops on route, and their destination.

## 1.3 Government advice

Government advice on whether and how to permit cycling in VRAs is contained in Local Transport Note 1/87 'Getting the Right Balance – Guidance on Vehicle Restrictions in Pedestrian Zones' and, more specifically, in Traffic Advisory Leaflet 9/93 'Cycling in Pedestrian Areas' (DoT 1993). The latter states that, based on the Trevelyan and Morgan (1993) research, '...wherever it is proposed to exclude significant numbers or classes of vehicles from a road or area, the highway authority should consider exempting cyclists. If there are likely to be high flows of pedestrians or cyclists, or both, then features should be provided to guide cyclists into and through the pedestrianised area.'

# 2 Objectives, method and survey locations

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## 2.1 Research objectives and scope

The objectives of the research were to:

- Obtain a better understanding of cyclist and pedestrian behaviour in VRAs.
- Provide practical guidance on the options available for increasing the safety and convenience for cyclists, without detriment to other users.

VRAs should be distinguished from other types of shared use area. They are often converted from central streets, which previously carried large amounts of motorised traffic. Some are very wide (more akin to squares than to roads) and the patterns of pedestrian and vehicle movements can be different to narrow linear routes.

This study is specifically about cycling in VRAs. It did not investigate the wider issue of 'shared use' by cyclists and pedestrians of converted footways, footpaths, bridleways, or similar linear routes. Nor did it address the issue of illegal cycling on footways. Other types of shared use area are the subject of separate studies for the DfT.

## 2.2 Types of shared space in VRAs

VRAs vary considerably in their characteristics and it was not possible to survey all types. Table 1 lists some of these different types of shared space in VRAs. Each of these types of shared use will have a different requirement for design and operational regulations. Each may also imply a different balance in the priority accorded to cyclists and other users.

## 2.3 Research method – Overview

Detailed research was undertaken at a total of four sites in three towns – Cambridge (two sites), Hull and Salisbury. This comprised a mixture of observation surveys (video monitoring, manual speed surveys and flow counts) and interviews with 300 pedestrians and 150 cyclists in order to investigate the relationship between actual and perceived behaviour. Further details of the methods are provided in Chapters 3 and 4.

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<sup>1</sup> The Traffic Signs Regulations and General Directions 2002 define a 'pedestrian zone' as an area which has been laid out to improve amenity for pedestrians and to which entry of vehicles is prohibited or restricted. Signs of diagrams 618.2 or 618.3 and variants are used to mark the start of the zone and examples of these signs are given in Appendix D. 'Vehicle Restricted Area' is a generic term with no specific sign.

**Table 1 A typology of shared space in VRAs**

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**Geographical location:**

- Urban shopping street
  - Square
  - Narrow traditional street
- 

**Former use:**

- Carriageway, for all traffic
  - Pedestrian space only
- 

**Strategic importance to cyclist:**

- Link in long distance route
  - Link for cross-town journeys
  - Part of commuter route
  - Local distributor only
- 

**Alternatives:**

- Network of traffic calmed or segregated lanes
  - Minor roads (probably indirect)
  - Busy roads with no special provision
- 

**Segregation:**

- Physically segregated by kerb or barrier
  - Visually segregated by white line or coloured surface
  - Unsegregated
- 

**Type of use:**

- Multi-directional for pedestrians, linear for cyclists
  - Mainly linear for pedestrians, linear for cyclists
  - Linear for all users
- 

## 2.4 Survey locations

Case studies were selected from sites submitted for consideration by local authorities, following a press release to national and regional transport publications. A major factor was the number of cyclists and pedestrians available for study, since many sites have few cyclists and many pedestrians, or *vice versa*.

Twelve towns were investigated and three - Cambridge, Hull and Salisbury - were selected for detailed study. These three are described in Table 2 and illustrated in Plates 1 to 4.

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**Table 2 Survey locations**

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*Brief description of location*

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**Fitzroy Street (2 sites), Cambridge**

Busy shopping street. Formerly open to all traffic. Very high cyclist flows. Cycling prohibited 10.00-16.00. Street totally unsegregated. Used by cyclists as commuter route; alternative is a mix of busy streets and residential roads. Linear movements for cyclists and mixed for pedestrians. Street widths 13 and 16 metres.

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**Whitefriar Gate, Hull**

Busy shopping street. Formerly open to all traffic. High cyclist flows. Cycling prohibited 11.00-16.00. Street totally unsegregated. Local distributor for cyclists only; alternatives are traffic calmed or restricted. Linear movements for cyclists and mixed for pedestrians. Street width 11 metres.

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**High Street, Salisbury**

Busy shopping street. Formerly open to all traffic - an 'A' road. 'Average' cyclist flows. Cycling permitted at all times. Street totally unsegregated. Forms part of leisure cycling route. Alternative routes have traffic restrictions. Linear movements for cyclists and mixed for pedestrians. Street width 14 metres.

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Two sites on Fitzroy Street, Cambridge were observed. As the sites were close together and the characteristics of the sites and the results proved very similar, they have been treated as a single site (averaged where appropriate) to simplify reporting.

The other locations where preliminary investigations were made were Eastbourne, Birmingham, Newcastle-on-Tyne, Horsham, Sutton, Chichester, Beverley, Kingston-upon-Thames and Southsea. For various reasons these sites were not suitable for detailed surveys. However, they were reviewed for design features that may have some relevance to the research findings. For example, Eastbourne and Horsham have similar, but different, methods of delineating an area.

## 3 Observation surveys – Cyclist behaviour

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### 3.1 Method

The surveys took place on weekdays between 08.00 and 18.00, covering periods of high and low pedestrian and cyclist flows. The main indicators chosen for measurement were:

- The number of cyclists pushing their cycles.
- The cycling speeds.
- The flow of cyclists.
- The flow of pedestrians.

A key objective was to test the hypothesis that a form of self-regulation exists whereby cyclists ride increasingly slowly (and eventually dismount) as the pedestrian flows increase.

The speed of bicycles (ridden or pushed) was obtained by timing them with a stopwatch over a fixed distance of 10-13 metres. As the speeds were generally low, it was possible to obtain reasonable accuracy using this method and trial runs using a bicycle with calibrated speedometer were used to confirm this.

The level of pedestrian flow through which the cyclists passed was also measured. The total number of pedestrians was counted during the two minutes before and after the cyclist passed through in order to give a flow per minute.

### 3.2 Results

The following sections outline the key findings from the observation surveys; however, additional details are presented in Appendix A.

#### 3.2.1 Pedestrian flows

Table 3 shows hourly pedestrian flows at the sites. The flows were higher in Hull and Salisbury than in Cambridge, partly because the former two sites are on main city shopping streets (in Hull the site was outside Marks and Spencer).

#### 3.2.2 Cyclist flows

A total of 2220 cyclists (including those pushing their cycles) were recorded (see Table 4). The highest flows





**Plate 1** Cambridge, Fitzroy Street (Site 1)

This site has no indication of any former footways. Problems have been reported here with cyclists travelling too close to the point where shoppers emerge from doorways.

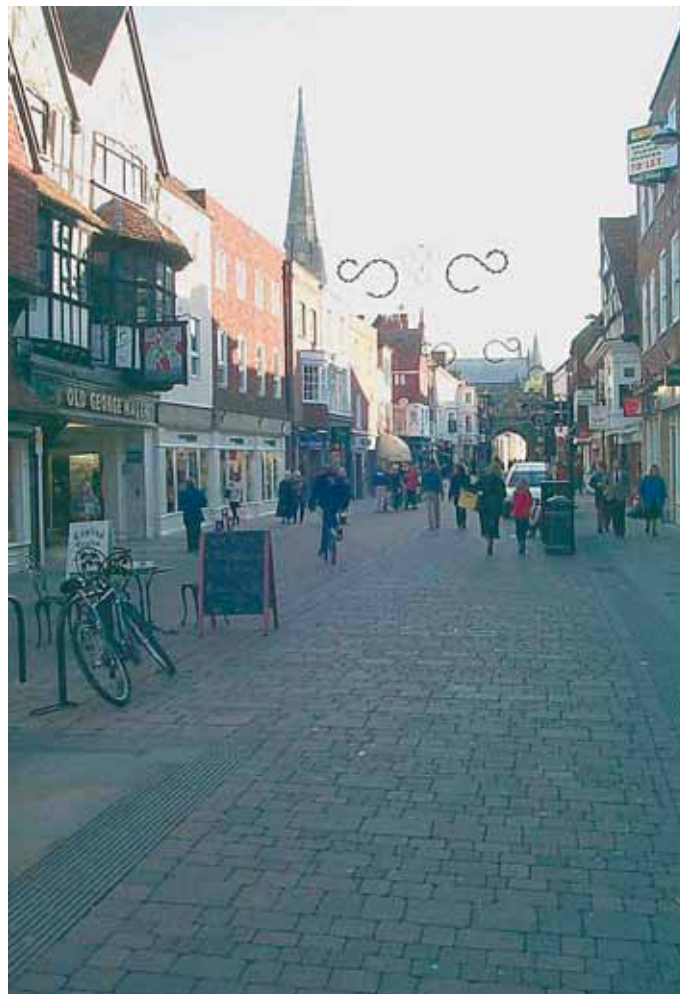


**Plate 2** Cambridge, Fitzroy Street (Site 2)



**Plate 3** Hull, Whitefriar Gate

Cyclists and cycle parking are accommodated in many principal pedestrian streets in Hull.



**Plate 4** Salisbury, High Street



**Table 3 Pedestrian flows**

Location	Pedestrians per hour	
	Average flow	Peak flow
Cambridge	877	1644
Hull	1884	4920
Salisbury	2093	4440

**Table 4 Cyclist flows, gender and age**

Location	Cyclist flows per hour				Total number of cyclists observed (N)
	Average flow	Peak flow	Male (%)	Estimated mean age (years)	
Cambridge	116	155 (16.00-17.00)	57	28	1849
Hull	40	60 (08.00-09.00)	82	34	273
Salisbury	14	19 (13.00-14.00)	69	39	98
Total	58	n/a	61	29	2220

were in Cambridge: at peak cycling times there were 155 cyclists per hour – over 2.5 cyclists per minute. By contrast, peak flows in Salisbury reached only 19 cyclists per hour. The average for all sites was 58 cyclists per hour - just under one cyclist per minute. In Cambridge, the ratio of males to female cyclists was close to parity but in Salisbury, and particularly in Hull, male cyclists considerably outnumbered female cyclists. Overall, 61% of cyclists observed were male. The differences in the ages of cyclists between locations were considerable. Cyclists in Cambridge were an average of six years younger than cyclists in Hull and eleven years younger than those in Salisbury. Duncan’s Statistical Test indicates that these differences were statistically significant.

### 3.2.3 Cyclists dismounting and pushing

Table 5 shows the percentage of cyclists pushing their bikes at each site. Outside of the ban period in Cambridge, an average of 11% of cyclists were pushing their cycles. This was often because of accompanying friends, e.g. on school journeys. In Hull, the figure was higher at 27%. In Salisbury, 40% of cyclists pushed their cycles.

**Table 5 Percentage of cyclists pushing their bicycles, by location**

Location	Percentage of cyclists pushing		
	All day average	Outside ban	During ban
Cambridge	22	11	39
Hull	36	27	46
Salisbury	40	40	n/a

The explanations for the differences in dismounting rates outside ban periods are not entirely clear but a number of factors seem relevant. Cambridge has a strong culture of cycling and bans on cycling in VRAs have been strongly opposed. There were also many facilities in Cambridge

where shared-use by cyclists and pedestrians was legal. Salisbury had the highest average age of cyclists. It may also be the case that a higher percentage of cyclists in Salisbury were shopping or otherwise visiting the city centre compared with the other two towns. Additionally, the relatively low flows of cyclists may have exerted a social pressure on cyclists to dismount.

Cycling was banned at the sites in Cambridge from 10.00-16.00, and in Hull from 11.00-16.00. During the period in which the cycling bans applied, 39% of cyclists in Cambridge and 46% in Hull pushed their cycles, while the majority continued to ride (illegally). There was no ban on cycling at the site in Salisbury, but the percentage of cyclists ‘choosing’ to dismount was similar at 40%. There was a notable similarity in dismounting rates (at around 40%) across all sites during the central part of the day.

### 3.2.4 Cycling speeds

Table 6 shows the speeds of cyclists riding their bikes at the survey locations. Average speeds were highest in Cambridge (16.7 km/hr) and lowest in Hull (10.9 km/hr). Speeds in Cambridge were consistently higher, at all times of the day, than in Hull and Salisbury. However, the differences are less than those suggested by the average speeds because the Cambridge data included proportionately fewer cyclists at pedestrian peak hours (when cycling speeds were shown to be lower). Across all the sites, the overall average mean speed was 16km/hr and the overall 85<sup>th</sup> percentile speed was 22.7 km/hr. However, these averages are biased toward Cambridge, where more cyclists were observed and speeds were higher.

**Table 6 Cycling speeds by location (excludes cyclists pushing)**

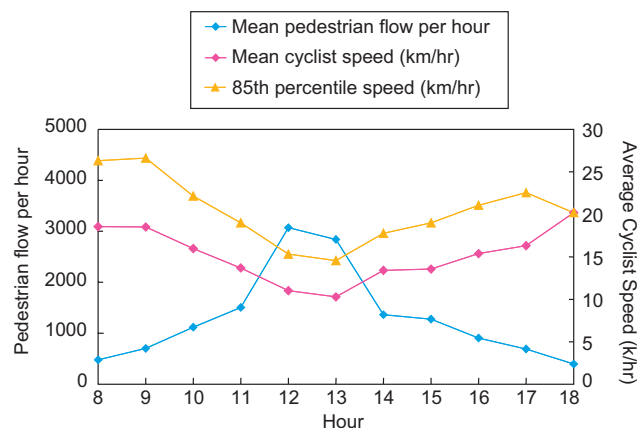
Location	Cycling speed (kilometres per hour)			Number of cyclists
	Mean speed	85 <sup>th</sup> percentile	Standard error of mean	
Cambridge	16.7	23.5	0.2	1447
Hull	10.9	15.2	0.3	175
Salisbury	12.1	16.4	0.6	59
Overall	16.0	22.7	0.2	1681

To some extent, the speeds of cyclists followed the geographical nature of the sites and the types of cyclist. Cambridge Fitzroy Street is on a slight slope and is used as a commuter route more than the others. Salisbury is part of the Wiltshire (leisure) cycle route, whereas Hull has a good network of city centre streets that are available for cyclists making through journeys.

As a check on the speed survey method, the speed of those pushing bicycles was also noted. This showed reasonably consistent measurements across the four sites, with slight variations explicable by the characteristics of the users (Hull and Salisbury had more alternative routes for those who were in a hurry). The overall average speed of cyclists pushing their cycles was measured as 6 km/hr. This is a little above average walking speed (4-5 km/hr) and suggests that the method did not underestimate speeds.

### 3.2.5 Relationship between cycling speeds and pedestrians flows

Figure 1 presents the average cycling speeds and the pedestrian flows per hour throughout the day for all sites combined. This shows that, as the flow of pedestrians increases, the average and 85<sup>th</sup> percentile speeds of cyclists fall. At the peak flows of pedestrians (11.00-14.00) average cycling speeds fall to around 10 km/hr. (The percentage of cyclists pushing was also highest during this period.) However, even at peak times, a small minority of cyclists continued to ride at speeds approaching 20 km/hr, especially in Cambridge.



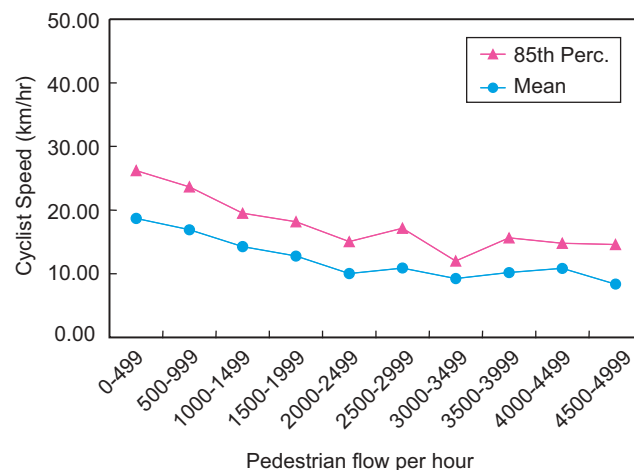
**Figure 1** Pedestrian flows and average cyclist speeds throughout the day (all sites combined – excludes cyclists pushing)

Table 7 shows the relationship between pedestrian flows and average cycling speeds in more detail. (The pedestrian flows are shown for the mid-point of groups of flow levels 0-500, 500-1000, etc. Cyclists pushing their cycles are excluded.) Although sample sizes for the highest pedestrian flows are small, these data show that cyclists slow down as pedestrian flows increase (see also Figure 2). At high flows, (above 2000 pedestrians per hour) around a quarter of cyclists that do not dismount slow almost to walking pace.

**Table 7 Relationship between cycling speeds and pedestrian flows**

Pedestrian flow (peds/hr)	Cycling speeds (km/hr) where cycled		% pushing
	85 <sup>th</sup> percentile	Mean	
0-499	26.2	18.7	10
500-999	23.7	16.9	15
1000-1499	19.5	14.3	35
1500-1999	18.2	12.8	47
2000-2499	15.0	10.0	44
2500-2999	17.2	10.9	38
3000-3499	12.0	9.3	30
3500-3999	15.6	10.2	56
4000-4499	14.8	10.8	38
4500-4999	14.6	8.4	44
Overall	22.7	16.0	24

Figure 2 shows the relationship between cycling speeds and pedestrian flows. It excludes those cyclists who dismounted and pushed their cycles yet still identifies a negative correlation between cycling speeds and pedestrians per hour, i.e. the higher the pedestrian flows, the slower the cyclists travelled, as we would expect (with a Pearson's correlation coefficient value of - 0.305).



**Figure 2** Relationship between cycling speeds and pedestrian flows

The exclusion of those cyclists who pushed their cycles also means that the Pearson's value understates the extent to which cyclists moderate their behaviour as pedestrian flows rise. An independent t-test associated a much greater average flow of pedestrian traffic with the incidence of cyclists pushing (975 pedestrians per hour were encountered by those who had cycled, and 1369 pedestrians per hour were encountered by those who had pushed). These statistical tests all gave results of at least a 95% level of confidence. The results indicate that as pedestrian flows rise, the incidence of cyclists choosing to push their cycles also rises. Those cyclists who continue to ride tend to do so at a lower speed.

### 3.2.6 Who cycles faster?

In order to determine the type of person that cycles faster than the others, the data were divided into quartile groups by cycling speed. Table 8 shows that the fastest group was generally younger than the others, using mean estimates of age (see also Figure 3), and more likely to be male.

**Table 8 Characteristics of cyclists by speed quartile, excluding periods of cycling bans**

Speed quartile	Age	% Male
Lowest (<=11.8km/hr)	31	61
All quartiles	28	62
Highest (>=20.62km/hr)	25	71

The average speed of male cyclists (including cyclists who push) was significantly higher than that of female

cyclists (14.4km/hr and 12.3km/hr). Excluding those who either pushed their bicycles or cycled during a ban, the average speed of male cyclists remained higher than that of female cyclists (17.3km/hr and 15.9km/hr respectively). The difference was emphasised by the average pedestrian flow per hour during periods when legal cycling was being monitored, which was significantly higher for male cyclists than female cyclists (801 and 699), i.e. male cyclists rode faster despite the presence of higher pedestrian flows.

The tendency for young cyclists (15-24 years) to ride faster than others is shown in Figure 3. However, the speed of those in the 25-34 age-range is not far behind.

Further information on the types of cyclists at each site was obtained in the interview survey and is described in the next Chapter.

### 3.2.7 Effectiveness of cycling bans

The above data confirm that cyclists tended to slow down or dismount as pedestrian flows increased. As cycling bans largely coincided with peak pedestrian flows, it was difficult to separate the effects of a ban from the effects of pedestrian flows. To resolve this, ANOVA statistical tests were conducted.

Initially the test was restricted to only three main factors: cycling ban, pedestrian flow and site location. This indicated that all three contributed significantly towards explaining the variability in the percentages of cyclists pushing.

The factor ‘site location’ is likely to include features such as the physical differences between sites, and the differences in the numbers and types of cyclists. For example, this factor took account of the higher hourly cycle flows in Cambridge and the lower average age.

Adding interaction terms to the ANOVA then produced four significant factors:

- Pedestrian flow.
- Site location.

- Interaction between pedestrian flow and a cycling ban.
- Interaction between pedestrian flow and site location.

As might be expected, a similar ANOVA investigation of cycling speed indicated that a cycling ban, pedestrian flow, and site location all significantly contributed towards explaining speed variability. It appears that cyclists become more cautious if they know that a ban is in effect, even where they do not dismount.

A comparison of cycling speeds in Hull and Salisbury supports this observation. During the hour 10.00-11.00, cycling was permitted in both cities, and average cycling speeds were identical at 12km/hr. However, during the hours 14.00-1600, when pedestrian flows were similar in both cities but cycling was banned in Hull only, cycling speeds in Hull were an average of 2-3km/hr below those in Salisbury.

### 3.3 Conclusion

The data show that the majority of cyclists modify their behaviour in response to the level of pedestrian flow. Most cyclists at all sites dismounted or reduced their speeds as the flows of pedestrians increased.

Although a majority of cyclists continued to cycle in VRAs during the periods when cycling was prohibited, cycling bans increased the number of cyclists who dismounted, and reduced the average speed of those who continued to cycle (Figure 3). However, a minority (mainly in Cambridge) still cycled relatively fast (around 15-20 km/hr) in high pedestrian flows (Figure 2). These cyclists tended to be young males (Table 8).

It is also evident that site-specific factors can significantly affect the behaviour of cyclists in VRAs. Cycling speed and dismounting are influenced by the local characteristics of the site and its users. As might be expected, the width, layout and other physical characteristics of the sites (obstructions and gradient), the availability of alternative routes for ‘through’ cyclists, the local cycling culture and infrastructure, the level of cycle

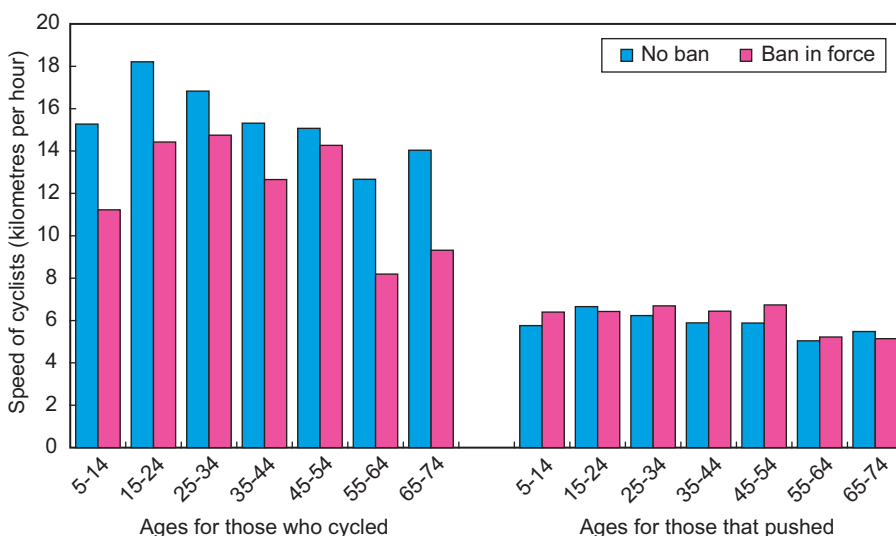


Figure 3 Speed and pushing by age of cyclists

flows and the percentage of cycle commuters also affect cycling speeds and tendency to dismount.

Additional details obtained from the observation surveys are presented in Appendix A.

## 4 Attitude surveys

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### 4.1 Method

The aim of the attitude surveys of pedestrians and cyclists in VRAs was to investigate the issues of cyclists using VRAs, and to seek suggestions for practical solutions to problems that might be acceptable to both parties.

Short, on-street, face-to-face interviews were carried out using a questionnaire. Three hundred pedestrians and 150 cyclists were interviewed, divided evenly amongst three VRAs (Cambridge, Hull and Salisbury) during August and September 1999. As the two Cambridge sites were so close together, one set of interviews covered both sites.

The findings from the interviews are summarised below. The questions asked and the full results are tabulated in Appendices B (Pedestrians) and C (Cyclists). It should be noted that where the interview referred to an 8mph speed limit for cyclists this had been chosen as a realistic indicator of a low speed that is compatible with pedestrians.

### 4.2 Results – Pedestrians

The majority of pedestrians interviewed were visiting the VRA for shopping. Most (about 70% to 80%, depending on site) walked in the area at least once a week. A substantial minority (17% overall) also sometimes cycled in the area.

Most pedestrians in Hull and Salisbury said there was ‘nothing’ that they found unattractive about the pedestrianised area. The question was open, and respondents were invited to answer freely, without prompting. The most comments on unattractive features were received in Cambridge, with litter/dog mess receiving 27 comments, and the presence of cyclists receiving 16 comments. Similar comments, but fewer in number, were received in Hull, while most respondents in Salisbury seemed to find little that they considered unattractive in the area.

When asked specifically about cyclists in the pedestrian area, the majority of pedestrians were ‘not at all’ or ‘not very much’ concerned. Concern was highest in Cambridge (37%), followed by Hull (32%), and least in Salisbury (20%), that is, the greatest concern was expressed where cycle flows and speeds were highest. Generally, people were not so much concerned about being injured themselves by cyclists, as worried about possible injuries to small children and elderly people. As noted, few people mentioned cyclists before being prompted. Other studies (e.g. Uzell *et al.*, 2000) have found similar results: asking about conflicts tends to stimulate concerns and harden opinions that might otherwise have remained unspoken.

In Salisbury, the pedestrians interviewed mostly thought that cyclists had consideration for pedestrians in the area, while the majority in Hull thought they did not. In Cambridge, opinions were divided on this, and on whether

pedestrians were generally considerate towards cyclists. In the other two survey areas, more of those interviewed felt that pedestrians generally did not show consideration for cyclists than thought they generally did. In Hull, those feeling that pedestrians did not show consideration to cyclists was particularly high at 65%.

When pedestrians were asked how much they agreed with a number of statements presented to them, those in Salisbury generally agreed that ‘the majority of cyclists in the pedestrian area behaved responsibly’ and disagreed that ‘there is a real risk of being injured by a cyclist’. Those in Cambridge and Hull were divided over whether cyclists behaved responsibly. Pedestrians in Cambridge generally agreed that it was impossible to enforce restrictions on cyclists, but those in Hull and Salisbury disagreed. Attitudes towards cyclists using the pedestrian area were generally most positive in Salisbury. It seems likely that this was related to the much lower numbers of cyclists, the higher percentage of cyclists who pushed their cycles, and the lower cycling speeds compared to Cambridge and Hull (see Chapter 3).

Of the measures suggested for restrictions on cyclists, the use of markings and signs to delineate where cyclists should ride (without speed restrictions) was most popular at all three sites, and with both the cyclists and pedestrians interviewed. However, it should be noted that none of the cities at which the interviews took place included examples of such delineation in heavily used pedestrian areas, so many respondents were unlikely to have been able to base their opinions on direct experience. Making cyclists give way to pedestrians was also popular, particularly in Cambridge and Salisbury. When the respondents were asked for other suggestions, making cyclists dismount and push their bikes through the area was frequently mentioned.

The majority of pedestrians in both Hull and Cambridge felt that it was a good idea to ban cyclists from pedestrian areas during part of the day to protect shoppers, and in Hull this was a particularly high percentage (70%). When asked at what time in the morning the ban should take effect, the largest number of respondents replied ‘after 9.00am’ in Hull and Salisbury, and ‘after 10.00am’ in Cambridge. The time stated by the largest number of respondents for allowing cyclists back into the area was 4.00pm at all three locations.

The respondents were shown a number of road signs and asked whether people were allowed to ride bicycles in areas covered by each sign. In most cases, the majority of respondents correctly understood the signs indicating where cycles were/were not allowed to be ridden/pushed. However, in some cases this majority was small. In particular, the *No Motor Vehicles* and *No Vehicles* seemed to cause problems.<sup>2</sup>

A significant minority of pedestrians (ranging from 5 to 16%) said they had, at some time, seen or been involved in an incident involving a cyclist and a pedestrian in the

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<sup>2</sup> *The Traffic Signs Regulations and General Directions 2002 (DfT 2002) provides details of prescribed signs. The No Motor Vehicles sign is diagram 619, and the No Vehicles sign is diagram 617. Examples of these signs are given in Appendix D.*



VRA. A broad definition was used to obtain more information, and some incidents were 'near misses'. However, the majority of the incidents involved some degree of injury, usually to the pedestrian but sometimes to the cyclist. The descriptions of the incidents suggested that one of the main causes of such incidents was collision between a cyclist and a pedestrian who was coming out of a shop. Other incidents involved excessively speeding cyclists, and cyclists running into the back of pedestrians. A substantial number of pedestrians suggested that marked cycle lanes within the area would be helpful.

### 4.3 Results – Cyclists

Most cyclists interviewed had come to the VRA for shopping, and the majority (about 80% at each site) cycled in or through the area at least once a week. Most of the cyclists also regularly walked in the VRA.

Cyclists were asked if there was anything about the pedestrianised area that they found unattractive. Generally, cyclists made fewer comments than the pedestrians, but they also noted dog mess and litter. Cambridge was thought to be too busy, and both Cambridge and Hull were considered to lack facilities for cyclists.

About 50% of cyclists in Hull were bothered or concerned 'very much' or 'quite a lot' by pedestrians when cycling in the VRA, and the corresponding figures for Cambridge and Salisbury were slightly over 60%. The main concerns about pedestrians were associated with their movements being unpredictable, and about small children not being properly supervised. Other issues frequently mentioned included clarifying the rules regarding cycling within the area (by adequate signing), pedestrians getting in the way, and the suggestion that cyclists should push their bikes in the area.

In Hull, the majority of cyclists interviewed thought that cyclists generally did not show consideration for pedestrians. In Cambridge opinion was divided, whilst in Salisbury, the majority who expressed an opinion felt that cyclists generally did not show consideration. In all three locations, a large majority of the cyclists interviewed felt that pedestrians generally did not show consideration for cyclists.

When cyclists were asked how much they agreed with a number of statements presented to them, all tended to agree that 'cyclists should be made to give way to pedestrians in pedestrianised areas', although those in Salisbury thought that 'the majority of cyclists in this pedestrianised area behave responsibly'. However, the survey method required cyclists to stop voluntarily, and would perhaps have tended to miss the minority of cyclists who speed and/or behave irresponsibly.

Of the measures suggested for managing or restricting cyclists, the use of markings and signs to delineate where cyclists should ride (without speed restrictions) was the most popular with cyclists, as it was with pedestrians, at all three sites. When the cyclists were asked for other suggestions, making cyclists dismount and push their bikes through the area was mentioned, as it had been by the pedestrians interviewed.

The majority of cyclists in both Cambridge and Hull felt that it was a good idea to ban cyclists from pedestrian

areas for part of the day to protect shoppers. This idea was quite strongly opposed (by 70%) in Salisbury, however, where there is no tradition of banning cycling in VRAs.

When they were asked at what time in the morning cyclists should be banned, the time stated by the largest number of respondents was 9.00am in Salisbury, 10.00am in Cambridge, and in Hull, respondents were almost equally divided between 9.00 and 10.00am. The time suggested by the largest number of respondents for allowing cyclists back into the area was 3.00pm at Salisbury and 4.00pm at Cambridge and Hull.

The respondents were shown a number of road signs and asked whether people were allowed to ride bicycles in areas covered by each sign. In most cases, the majority of respondents correctly understood the signs indicating where cycles were/were not allowed to be ridden/pushed. However, in some cases, this majority was small. In particular, the *No Motor Vehicles* sign caused problems in Hull and Salisbury, and the *No Vehicles* sign caused some uncertainty at all three sites.<sup>3</sup> Overall, the cyclists' understanding of the meaning of these signs was slightly better than that of the pedestrians, but the difference was not great.

Around 12% of cyclists said that they had seen or been involved in an incident with a pedestrian in the VRA. Most of these involved some injury, but about one third referred to arguments as to whether cyclists should be riding in the area. The description of incidents by respondents suggests that cycling too fast was a source of conflict.

As with the pedestrians, the cyclists' other comments were very varied. They also raised many of the same points as those raised by pedestrians. Most frequently mentioned was the idea that cyclists should be segregated from pedestrians within the VRA by designated areas, or marked cycle tracks and signing. A surprisingly high number of cyclists suggested that cycles should be pushed through the area, or that cyclists should be banned from the area completely. The vast majority of the cyclists also frequently walk within the areas.

### 4.4 Local authority and police attitudes

A number of local authorities responded to TRL's invitation to comment on the issue of cyclists using VRAs. Many local authority officers expressed concern that there was a high perception of danger among the public, and yet there was no standard method for them to use to assess this. As far as they were aware, accidents involving bicycles and pedestrians rarely required hospital treatment, so, if no injury occurred, there was no legal requirement to report them to the police. Consequently, very few are recorded on police accident databases which local authorities also use.

Opinions were also sought from the police. One officer stated that his force received more correspondence about

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<sup>3</sup> *The Traffic Signs Regulations and General Directions 2002 (DfT 2002) provides details of prescribed signs. The No Motor Vehicles sign is diagram 619, and the No Vehicles sign is diagram 617. Examples of these signs are given in Appendix C.*

cycling on footways than on any other issue. However, that related to illegal cycling on footways, not to the legal shared use of VRAs. Another officer said that part-time bans were difficult to enforce and it was hard to prosecute erring cyclists.

## 5 Design issues

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### 5.1 Physical segregation

A question facing the designer of a VRA that may accommodate cyclists is whether to attempt to segregate cyclists and pedestrians and, if so, by what means. Groups representing visually impaired people have demanded physical segregation by a fence or similar barrier. However, practicalities and aesthetics rarely make this feasible. Even strong visual delineation, such as a coloured lane, would be unlikely to fit the urban design objectives of an area such as Victoria Square in Birmingham.

One feature of the towns visited as part of this study, where urban design and cycle provision did appear to be harmonious, was that street furniture was used to give the impression that cyclists should tend towards a particular route. This can be used to channel cyclists away from doorways. In Eastbourne, this was managed by using decorative posts; in Horsham, by the use of large concrete planters.

Plates 5-8 give some indication of how the presence, or otherwise, of a differentiation between the former roadway and the former footway may affect safety. This may help avoid accidents, such as the ones mentioned in the surveys, where cyclists collided with pedestrians emerging from shop doorways. Such differentiation can be achieved using low sloping kerbs (Birmingham New Street), or by using features such as trees, posts or other street furniture, or changes in surface material. Tactile differentiation may assist blind and partially sighted people.

### 5.2 Time restrictions

In many towns and cities, including Cambridge and Hull, cyclists are permitted to use the VRA for part of the day. Practitioners need to consider which hours are appropriate and how this should be regulated. Clear and unambiguous signing is important and variable message signs may be a useful option. In some locations, the change from *cycling permitted* to *no cycling* (or *no vehicles*) is enforced by gates (as in Cambridge) or barriers (as in Birmingham High Street), which are moved by local authority staff. Education of local cyclists, effective publicity, and enforcement by the police may also be necessary.

## 6 Conclusions

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This report presents objective data on the use of VRAs by cyclists in order to improve our understanding of a topic that can be controversial, and where there are sometimes conflicting needs. It does not take up a position on the general question of whether cyclists should be permitted to use VRAs. Rather, it seeks to provide objective

information for practitioners involved with the design and maintenance of VRAs, and for others who need to answer these questions.

The observation surveys showed that the majority of cyclists in VRAs modify their behaviour by slowing down or dismounting as pedestrian numbers increase. However, a significant minority (mostly young males) rode fast in VRAs, even at pedestrian peak periods. Cyclists are more likely to dismount or slow down where there is a cycling ban, where pedestrian flows are high, where cyclist flows are low and where the percentage of young male cyclists is low. Other local factors also influence cyclist behaviour.

The pedestrian attitude surveys showed that the majority of pedestrians were not particularly concerned about cyclists in the pedestrian area - before prompting, more pedestrians spontaneously cited litter to be a problem than cycling. Most pedestrians accepted sharing with cyclists in VRAs. However, in two of the three survey cities, a majority of pedestrians were in favour of banning cyclists for at least part of the day. Pedestrians' concerns about cyclists were greater when the flow of cyclists was higher.

A small, but not inconsiderable, number of pedestrians reported having seen, or been involved in, an incident with a cyclist in a VRA. Some of those incidents had involved injury. This suggests that STATS19 road accident reports might not provide a comprehensive indication of pedestrian safety in VRAs.

Although most pedestrians and cyclists understood the meaning of traffic signs used to indicate the permitted users and prohibited traffic in VRAs, a substantial minority did not. Improvements in public understanding may be achievable through appropriate publicity and education.

Expecting pedestrians and cyclists to share these areas is not an ideal solution. Most pedestrians would probably prefer not to have cyclists using VRAs at busy times and no doubt many cyclists would prefer not to have to negotiate pedestrians. However, as with many planning and traffic problems, there may be no ideal solution and a compromise may be the most practical arrangement in terms of trying to marry sustainable transport objectives with public inclinations. The possible risks to pedestrians (and cyclists) will need to be weighed against the possible risks to cyclists if they are forced to use unsuitable roads to avoid the VRA, particularly where it occupies a significant desire-line for cyclists. There will also be other (non-safety) issues to consider, such as the importance of the route to cyclists and pedestrians, and the potential for satisfactory compromises through, for example, time restrictions, physical design, education and enforcement.

The surveys indicated broad agreement among the public that some attempt at segregation of pedestrians and cyclists within VRAs would be desirable. However, none of the sites where attitude surveys were undertaken included segregation, so opinions were probably based on supposition or perhaps experience gained elsewhere. It is also possible that cyclists' perceived ownership of segregated space would increase, resulting in increased speed. Pedestrians meanwhile, especially very young or elderly people, might continue not to expect to encounter cycles in the vehicle restricted area.





**Plate 5** Beverley



**Plate 6** Cambridge, Fitzroy Street

Problems were reported here with cyclists travelling too close to the point where shoppers emerge from doorways



**Plate 7** Horsham

Some differentiation of the former footway area is maintained Horsham using trees in pots. Cycle parking is provided inside the pedestrian area



**Plate 8** Barrow in Furness

Large numbers of workers from nearby shipyards cycle through the town centre sometimes despite 'no-entry' signs, though footway delineation is maintained using coloured bricks and short posts.

Taking account of the results of the wider survey of sites described in Chapter 5, those VRAs permitting cycling that seemed to work most satisfactorily showed the following characteristics:

- Wide spaces.
- Clear signs.
- Street furniture channelling cyclists towards the centre of the street, away from doorways.
- Footway and carriageway areas still defined to some extent.

Local authorities considering these issues might find it helpful to undertake observation surveys similar to those carried out for this report. The survey costs are not especially onerous and objective data on the behaviour of cyclists in regional situations would help to inform local debate.

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## 8 Acknowledgements

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## Appendix A: Observation surveys – Detailed results and statistics

### General

Note. A few data periods were excluded from the analysis because they were incomplete, or the numbers of cyclists recorded were too low to provide reliable results.

### Detailed tables

**Table A1 Cyclist volumes and speeds by hour of day**

Hour of day	Cycled (excluding instances where pushed)												Cycled or pushed								
	Cambridge combined			Cambridge 1			Cambridge 2			Salisbury			Hull			Overall					
	Km/hr	85 <sup>th</sup> %tile	N=	Km/hr	85 <sup>th</sup> %tile	N=	Km/hr	85 <sup>th</sup> %tile	N=	Km/hr	85 <sup>th</sup> %tile	N=	Km/hr	85 <sup>th</sup> %tile	N=	Km/hr	85 <sup>th</sup> %tile	N=			
8-9	19.1	27.2	285	19.3	29.3	154	18.8	24.7	131	-	-	-	13.4	17.6	25	18.6	26.4	310	17.7	26.1	334
9-10	19.3	26.8	192	19.8	29.2	80	19.0	25.8	112	-	-	-	11.4	17.9	21	18.6	26.8	213	16.6	25.8	253
10-11	16.9	23.2	112	17.2	24.7	57	16.6	20.8	55	12.1	15.7	7	12.1	15.6	20	16.0	22.3	139	12.8	19.4	211
11-12	14.3	19.2	96	14.6	19.4	49	13.9	19.1	47	11.6	14.9	10	11.4	16.4	13	13.7	19.1	119	10.3	17.0	219
12-13	-	-	-	-	-	-	-	-	-	12.6	17.7	12	10.3	14.8	21	11.1	15.4	33	9.2	14.4	55
13-14	-	-	-	-	-	-	-	-	-	11.8	17.3	20	8.6	11.1	18	10.3	14.5	38	8.2	12.1	64
14-15	13.8	18.0	99	13.8	18.0	99	-	-	-	13.2	17.8	4	8.4	10.8	9	13.4	17.6	112	10.1	15.9	208
15-16	14.1	19.6	127	14.1	19.6	127	-	-	-	12.7	19.4	6	8.3	9.9	12	13.5	19.1	145	11.1	16.6	224
16-17	15.7	21.3	269	15.7	21.3	269	-	-	-	-	-	-	10.5	13.2	20	15.3	21.1	289	14.0	20.4	336
17-18	16.6	23.0	267	16.6	23.0	267	-	-	-	-	-	-	11.4	15.2	16	16.3	22.4	283	15.2	21.9	316
Overall	16.7	23.5	1447	16.4	23.2	1102	17.8	24.1	345	12.1	16.4	59	10.9	15.2	175	16.0	22.7	1681	13.6	21.1	2220

- = Times at which cycling is prohibited.

**Table A2 Cyclist speeds during and outside cycle bans (kilometres per hour)**

Location	No ban				Ban in force				All cases			
	Mean speed km/hr	85 <sup>th</sup> %ile	Std. error of mean	No. of obs.	Mean speed km/hr	85 <sup>th</sup> %ile	Std. error of mean	No. of obs.	Mean speed km/hr	85 <sup>th</sup> %ile	Std. error of mean	No. of obs.
Cambridge	17.6	24.5	0.2	1013	14.8	19.9	0.3	434	16.7	23.5	0.2	1447
A-Camb 1	17.1	24.5	0.2	770	14.6	19.9	0.3	332	16.4	23.2	0.2	1102
A-Camb 2	18.9	24.7	0.4	243	15.4	20.5	0.6	102	17.8	24.1	0.4	345
A-Hull	11.9	15.5	0.4	102	9.5	12.0	0.4	73	10.9	15.2	0.3	175
A-Salisbury	12.1	16.4	0.6	59	–	–	–	–	12.1	16.4	0.6	59
A-Overall	16.8	23.7	0.2	1174	14.0	19.5	0.3	507	16.0	22.7	0.2	1681
Cambridge	6.4	8.4	0.2	121	6.7	9.0	0.1	281	6.6	8.8	0.1	402
B-Camb 1	6.4	8.4	0.2	100	6.9	9.0	0.1	217	6.8	8.9	0.1	317
B-Camb 2	6.3	7.8	0.4	21	6.0	8.1	0.2	64	6.0	8.1	0.2	85
B-Hull	4.9	6.3	0.3	37	5.0	6.5	0.2	61	4.9	6.4	0.2	98
B-Salisbury	6.2	7.9	0.2	39	–	–	–	–	6.2	7.9	0.2	39
B-Overall	6.0	7.7	0.1	197	6.4	8.7	0.1	342	6.3	8.4	0.1	539
Average	15.2	22.8	0.2	1371	11.0	17.2	0.2	849	13.6	21.1	0.2	2220

A = Cycled B = Pushed

**Table A3 Pedestrian flow by hour of day**

Hour	Cambridge combined	Cambridge 1	Cambridge 2	Salisbury	Hull	Overall peds / hr
8-9	460	495	418	–	696	476
9-10	656	785	563	–	1085	710
10-11	1037	1190	878	1019	1617	1133
11-12	1319	1512	1117	1906	2585	1514
12-13	–	–	–	1943	3783	3180
13-14	–	–	–	1867	3922	2925
14-15	1219	1219	–	2523	2456	1377
15-16	1140	1140	–	2105	2342	1303
16-17	897	897	–	–	1012	911
17-18	698	698	–	–	644	701
Overall average	824	884	634	1857	1925	1071

The gaps in the data are explained by the gathering of the video data being undertaken during limited hours in each location.

**Table A4 Cyclist speeds by pedestrian flow**

Pedestrian flow	Cyclist speeds (km/hr) where cycled					% pushing	Mean cyclist speed (pushing or cycling)
	Maximum	85 <sup>th</sup> %ile	Mean	15 <sup>th</sup> %ile	Minimum		
0-499 peds/hr	37.6	26.2	18.7	11.3	2.9	10%	17.5
500-999 peds/hr	45.1	23.7	16.9	10.7	2.7	15%	15.3
1000-1499 peds/hr	43.3	19.5	14.3	8.7	1.6	35%	11.6
1500-1999 peds/hr	27.5	18.2	12.8	8.5	3.5	47%	9.7
2000-2499 peds/hr	16.4	15.0	10.0	6.7	5.7	44%	8.2
2500-2999 peds/hr	21.9	17.2	10.9	7.5	3.7	38%	8.7
3000-3499 peds/hr	12.0	12.0	9.3	6.0	5.9	30%	8.1
3500-3999 peds/hr	19.5	15.6	10.2	7.3	4.5	56%	7.0
4000-4499 peds/hr	14.8	14.8	10.8	7.8	7.6	38%	9.0
4500-4999 peds/hr	17.3	14.6	8.4	4.3	4.1	44%	7.4
Overall average	45.1	22.7	16.0	9.4	1.6	24%	13.6

**Table A5 Outcome of logistic regression**

	Predicted count		% correctly allocated
	Cycled	Pushed	
<b>Observed</b>			
Cycled	1196	485	71.15%
Pushed	156	384	71.11%
Overall			71.14%

**Table A6 Logistic regression model parameters\***

Variable	Beta	Standard error	Significance of item	R	Exp (beta)
Absence of a ban	-1.1581	0.1254	<0.0001	-0.1839	0.3141
Ped flow per hour	0.0002	0.0001	0.0228	0.0359	1.0002
Gender (male)	-1.0398	0.1161	<0.0001	-0.1782	0.3535
Age of cyclist	0.0441	0.0043	<0.0001	0.2023	1.0451
Cycle flow per hour	-0.0080	0.0018	<0.0001	-0.0861	0.9921
Constant	-0.7280	0.3087	0.0184	-	-

\* The cut point for assignment between cycling and dismounting was given by a model value of 0.24. Any computed outcome less than this value resulted in an individual being assigned as a riding cyclist, while any higher value higher implied dismounting. The separation value was chosen to maximise the correct assignment for both individual categories, although it reduced the overall level of correct assignment.

## Statistical Analysis

### *Factors influencing cycling speeds*

Excluding cases where cyclists pushed their bicycles (and seven instances where the age of the cyclist was not given) strong negative correlations were found between the speed of cyclist and both:

- Age of cyclist.
- Number of pedestrians per hour.

Together with a positive correlation with cycling speed:

- Cycle flow per hour (including cyclists who dismount).

These were all highly significant outcomes (having confidence levels of 99%) indicating that speeds are:

- Higher at times when cycle flows are higher.
- Lower as the cyclist age rises.
- Lower when the pedestrian flow is higher.

Examination of the relationships between cycling speeds and the categorical variables of location, gender, and presence of a ban produced the following results:

- A one-way ANOVA indicated that location was a significant explanatory factor of the variability in cycling speeds – a Duncan's test identified that speeds were distinctly higher in Cambridge than in either Salisbury or Hull.
- An independent t-test indicated that male cyclists travelled faster than their female counterparts (by 1.15km/hr).
- A further independent t-test indicated that cycling speeds are faster (by 2.76km/hr) during periods when a ban is not imposed.

An ANOVA (containing main factors - location, gender, and whether a ban was present; three covariates of cycle flow per hour - pedestrian flow per hour, and year age of cyclist; inclusive of a constant, and dependent variable - cycling speeds) explained a significant amount of variability in speeds – with each component contributing to the explanation. It would appear that cyclists ride faster in Cambridge; male cyclists ride faster than their female counterparts; and that cyclists ride faster during periods when cycling bans are not operational than when they are.

A direct comparison between speed and pedestrian flow is provided in Table A4. Clearly, there is both a reduction in the speed of those who cycled, and an increasing tendency of cyclists to push their bicycles, up to, and including, a pedestrian flow of 1500-1999 pedestrians per hour.

Beyond this range of pedestrian flow, cycling speeds (including instances where the cyclist was riding illegally) do not appreciably alter, nor does the proportion of those cyclists pushing consistently increase. These observations might be limited by the sample sizes of higher pedestrian flows, and may also indicate some reluctance among some cyclists to change to pushing, even when their speeds were being inhibited by the presence of pedestrians.

### *Factors influencing dismount behaviour*

Including all cyclists (save for seven instances where the age of the cyclist was not given) and comparing instances

where the cyclists dismounted with those where the cyclist continued to ride, three chi-squared tests indicated:

- A lower incidence of dismounting in Cambridge (22%) compared to either Salisbury (40%) or Hull (36%).
- A higher incidence of dismounting among females (32% compared to 19% for males).
- A higher incidence of pushing during periods of a ban (40% compared to 14% when a ban was not in effect).

The correspondence of dismounting with the continuous variables, cycling flows per hour, pedestrian flows per hour, and cyclist's age, were as follows:

- An independent t-test indicated that cycling flows per hour were higher (by 28 cyclists) where dismounting did not occur.
- A second independent t-test indicated that there were substantially more pedestrians present during periods when cyclists dismounted (395 extra pedestrians per hour).
- A third independent t-test indicated that dismounting behaviour was more common among older cyclists (a difference in mean age of about seven years).

A logistic regression for dismounting, using categorical variables location, gender, and presence of a ban, with continuous variables cycling flow per hour, pedestrian flow per hour, and cyclist's age, including a constant, and with dismounting as the dependent variable, successfully identified more than two thirds of dismounting from cycling activity.

This model did not require inclusion of the location, although all other variables were necessary.

The absence of a ban in operation, the gender of cyclist (male), and a higher cycling flow per hour, all contributed towards identifying cyclists who did not dismount. Higher pedestrian flows and higher cyclist's ages contributed to the identification of cyclists who did dismount.

## Appendix B: Attitude survey – Detailed results (pedestrians)

Sample Size = 300 (100 at each location). NB One survey in Cambridge covered both sites in Fitzroy Street.

### i) Visits to the Vehicle Restricted Area

Q1. What is the main purpose of your visit to this pedestrianised area today?

	Percent		
	Cambridge	Hull	Salisbury
Shopping	61	67	63
Going to work	10	12	16
Going home from work	2	1	3
Going to school/ college/ university	1	0	8
Going home from school/college/university	0	0	0
In the course of business	4	3	1
Socialising/meeting friends	3	4	3
Personal business	13	8	4
Leisure	5	4	2

Q2. About how often do you walk in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
More than once a day	14	11	13
About once a day	9	14	13
Several times a week	28	29	43
About once a week	17	25	15
About once a fortnight	8	7	5
About once a month	11	4	3
Less than once a month	13	10	8

Q3a. Do you ever cycle in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	30	11	12
No	70	89	88

Q3b If yes, is that frequently or occasionally?  
(Percentage is of total sample)

	Percent		
	Cambridge	Hull	Salisbury
Frequently	17	6	5
Occasionally	12	4	6

### ii) Attractiveness of the Vehicle Restricted Area

Q4. Is there anything about this pedestrianised area that makes it unattractive?

	Number of mentions		
	Cambridge	Hull	Salisbury
Quality of shops	5	1	0
Attractiveness of area/shops	2	0	0
Inconvenient for bus stops/car parks	0	1	0
Litter/dog mess	27	12	2
Youths	0	2	2
Cyclists in pedestrianised area	16	9	2
Crowds/busy	5	7	0
Surfaces	2	4	0
Nothing	48	52	81

Q4. Other mentions:

Cambridge – Beggars, tramps, burger vans, drunks, seats needed  
 Hull – Lorries delivering, smells, street vendors, buskers, cars, safety, security  
 Salisbury – Too many signs, cars, sloping pavement, people walking about with food, skateboarders, block paving too small, needs more plants, needs more seats, cycle racks should be in the centre

### iii) Attitudes to cyclists and pedestrians sharing the Vehicle Restricted Areas.

Q5. How much are you bothered by cyclists in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Very much	12	5	5
Quite a lot	25	27	13
Not very much	30	36	22
Not at all	33	29	60

Q6a. In this pedestrianised area, how concerned are you about....

	Mean concern rating*		
	Cambridge	Hull	Salisbury
Generally having to look out for cyclists	3.1	2.6	3.7
Not being able to hear cyclists	3.1	3.2	3.2
Being injured yourself by a cyclist	3.4	3.1	3.9
Small children being injured by a cyclist	2.3	2.1	2.5
Elderly or infirm people being injured by a cyclist	2.2	2.0	2.7
Not knowing whether pedestrians or cyclists have priority	3.3	3.1	2.9
The speed at which cyclists ride	2.6	2.2	2.8

\* 1 = very concerned, 5 = not at all concerned



Q6b. What other problems are caused by cyclists in pedestrian areas?

Cambridge

- Aggressive behaviour
- They just get in the way
- Students often cycle in groups, which is very dangerous
- Cyclists not ringing their bells
- Cyclists weaving in and out between pedestrians
- There should be a route for cyclists
- They take up too much space
- Cyclists go too fast
- Cyclists should not be allowed to cycle in these areas
- Cyclists taking up too much room on the pavement and in the parking areas
- Cyclists don't pay attention to pedestrians
- I think a lot of the problems are foreign students who don't know the language
- Having somewhere to leave their bikes – there isn't always enough space
- Cyclists not reading the signs
- Not riding in single file
- Accidents between cyclists and pedestrians
- They ride their bikes when they should be pushing them
- They don't look where they are going
- Signing is not clear

Hull

- You have to be on your guard all the time
- Trampling in and out between pedestrians when they push their bikes
- Cyclists weave in and out between pedestrians (2 mentions)
- People being knocked down
- Creeping up behind you and you don't know they are there
- Parking cycles on shop windows
- Cyclists should have their own designated areas
- Danger of accidents when the area is busy
- Cyclists should have bells and use them (2 mentions)
- Cyclists riding too fast (2 mentions)
- Cyclists thinking they have right of way
- The cheek they give you when you tackle them (2 mentions)
- Should be totally banned
- Bikes not chained to bike stands. On busy days they are left everywhere
- Accidents, being wheelchair-bound
- Short-sighted (one eye)/ blind

Salisbury

- BMX are a bit dangerous
- Lights
- Not enough bike stands
- Mountain bikes
- Speed, go too fast and play around too much
- Cyclists don't know where they are allowed
- Not enough bars to tie bikes to so they are left around
- General lack of consideration and damage to street furniture
- Cyclists are a problem when it's busy
- Need to have a bell on the bike (3 mentions)
- Tend to leave bikes in silly places – up against glass windows (3 mentions)
- Don't give way to pedestrians
- A bit rude if you say anything ungracious
- Weaving in and out of people, particularly young ones.

Q6c. Do you think cyclists generally have consideration for pedestrians in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	47	23	57
No	45	63	29
Don't know	9	14	14

Q6d. Do you think pedestrians generally have consideration for cyclists in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	43	16	33
No	46	65	52
Don't know	11	18	14

Q7. How much do you agree with each of the following statements?

	Mean agreement rating*		
	Cambridge	Hull	Salisbury
I have mixed feelings- I don't like sharing pedestrian areas with cyclists but it's dangerous for them in traffic	2.6	2.3	2.4
In pedestrian areas cyclists of school age cause the most problems	2.9	2.9	2.3
I think there is a real risk of my being injured by a bike in this pedestrian area	3.3	2.9	4.0
It is fair and reasonable to allow cyclists in this pedestrianised area	3.0	3.2	2.7
The majority of cyclists in this pedestrian area behave responsibly	2.7	2.8	2.0
The presence of cyclists makes it less relaxing to walk here	2.7	2.6	3.4
It is impossible to enforce restrictions on cyclists	2.1	3.4	2.9

\* 1 = strongly agree, 5= strongly disagree

Q8a. Suppose a new pedestrian area like this was being made to be shared by pedestrians and cyclists, but with some restrictions on cyclists. Would you prefer the restrictions to be.....?

	Percent giving restriction as first choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	4	4	6
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	65	61	58
Allow cyclists in only at certain times of the day	10	14	3
Make cyclists give way to pedestrians	21	15	26
Don't know/ can't say	1	1	2

	Percent giving restriction as second choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	20	9	20
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	23	19	19
Allow cyclists in only at certain times of the day	29	39	10
Make cyclists give way to pedestrians	24	26	42
Don't know/can't say	4	4	4
	Percent giving restriction as third choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	20	30	22
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	5	7	11
Allow cyclists in only at certain times of the day	22	15	17
Make cyclists give way to pedestrians	28	28	17
Don't know/can't say	17	15	7

Q8b. What other restrictions would you like on cyclists in pedestrian areas?

Cambridge

- Make cyclists dismount in a pedestrian area (5 mentions)
- Separation between cyclists and pedestrians
- Children to be supervised on the bicycles
- Cyclists to ride in the middle of the walkway not near the shops
- Police enforcing
- Lights at night

Hull

- Ban them (3 mentions)
- Put a stick through their spokes
- Make them dismount and walk
- Ride slowly
- Signs are badly needed

**Salisbury**

- Make themselves heard/ use bell (3 mentions)
- They should push bikes through (8 mentions)
- Less speed
- I would like more cycle ways and zones
- They should all wear helmets
- Need cycle parks
- Slower speed than 8mph
- Cycling proficiency test should be mandatory
- A marked cycle area with speed limit (4 mentions)
- Cyclist should be registered like car drivers
- 5mph is plenty
- No cyclists should be allowed
- Should not tie bikes up against seats
- Restrictions don't work
- Young lads should be restricted

**iv) Banning cyclists from Vehicle Restricted Areas**

**Q9a. Suppose cyclists were to be banned from pedestrian areas during the day to protect shoppers, but not in the morning or afternoon, so they could cycle through them to and from work. What time would you say is the time in the morning after which cyclists should be banned from the area?**

Time after which cyclists should be banned in the morning	Percent		
	Cambridge	Hull	Salisbury
8.00 – 8.59	6	2	5
9.00 – 9.59	36	42	54
10.00 – 10.59	51	34	35
11.00 – 11.59	3	16	5
12.00 – 12.59	3	6	1
13.00 – 13.59	1	1	0

**Q9a What time would you say is the time in the afternoon or evening after which cyclists could be allowed back into the area?**

Time after which cyclists could be allowed back into the area	Percent		
	Cambridge	Hull	Salisbury
12.00 – 12.59	1	5	1
13.00 – 13.59	0	7	3
14.00 – 14.59	5	13	3
15.00 – 15.59	17	10	19
16.00 – 16.59	46	35	41
17.00 – 17.59	20	26	21
18.00 – 18.59	9	3	11
19.00 – 19.59	1	0	0
20.00 – 20.59	1	0	0

**Q9b. Do you think it is a good idea to ban cyclists from this pedestrian area for part of the day?**

	Percent		
	Cambridge	Hull	Salisbury
Yes	54	70	42
No	41	25	53
Don't know	5	5	5

**v) Knowledge of signs**

**Q10a. Do you think people are allowed to ride bicycles in areas covered by these signs? SHOW CARD**

	Percent		
	Cambridge	Hull	Salisbury
A – white bicycle on blue ground (TSRDG 955) <i>Cycle route-correct answer is YES</i>	Yes 84	86	87
	No 8	6	6
	Don't know 8	8	7
B – black m/cycle and car on white with red border 'except for access' (TSRDG 619 with Plate 620) <i>No motor vehicles-correct answer is YES</i>	Yes 65	44	54
	No 24	50	36
	Don't know 11	6	10
C – white line on red ground (TSRDG 616) <i>No entry-correct answer is NO</i>	Yes 19	9	21
	No 73	85	69
	Don't know 10	6	10
D – black bicycle on white with red border (TSRDG 951) <i>No cycling-correct answer is NO</i>	Yes 22	22	22
	No 67	67	72
	Don't know 11	10	6
E – white with red border 'No vehicles' (TSRDG 617 with Plate 618.1) <i>No vehicles-correct answer is NO</i>	Yes 15	20	30
	No 66	61	55
	Don't know 19	18	15

**Q10b. Do you think people are allowed to push bicycles in an area covered by this sign? (Percentages are of all answering 'NO' at E above)**

	Percent		
	Cambridge	Hull	Salisbury
Yes (correct answer)	69	55	76
No	21	23	17
Don't know	10	23	7



**vi) Reported incidents between cyclists and pedestrians in pedestrianised areas.**

Q11a. Have you ever seen or been involved in an incident between a cyclist and a pedestrian in a pedestrianised area?

	Percent	
	Cambridge	Hull
Yes	16	5
No	83	93
		Salisbury
		14
		84

Q11b. Could you describe the incident.

Cambridge

- Fitzroy St, Newsagents on corner 13.30. Child walking with mother. Cyclist riding very fast knocked the child over
- Fitzroy St. 15.30. Cyclist came across my path and caught my hand
- Someone came out of a shop and the cyclist knocked into her. The pedestrian was not looking where she was going. Sydney St.
- Morning time. I came out of a shop and a cyclist drove straight into me
- Young man mid 20s hit a girl of about 6. Never stopped. She was very shocked
- Banged on the back of my legs by a bike.
- Late at night, got knocked over, badly injured, cyclist had no lights
- People coming out of shops got knocked down. Approx. 8.30am. Badly shaken.
- About 11.00. Cyclist knocked over an old lady. I helped her. The cyclist never stopped
- Afternoon. I came out of M&S and was run down. The cyclist went over the handlebars.
- Afternoon, cyclist rode into lady, was very shocked.
- 11.00. A cyclist sped along and knocked a toddler down.
- Cyclist knocked me over. I was badly bruised. Early afternoon

Hull

- A lady came out of the shops and a cyclist knocked her down
- Cyclist hit someone as a pedestrian stepped onto the road
- Run into twice in this pedestrian area
- 16.00. I got undercut
- Sunday am. Cyclist came up behind me and ran into the back of me

Salisbury

- A cyclist was racing through the area when an elderly person stepped out of a shop and was knocked down
- Hit in the back by a cyclist
- Children using area as a speedway. A bike ran into me and broke my nose
- Group of cyclist ran into someone with a pram (from behind)
- I was on bike. I rang bell and called out but wasn't heard (he had personal stereo on). I fell off bike.
- Someone came out of a shop and was shaken when knocked down by a kid on a bike
- A kid cycled straight into the back of my wife (shocked but not hurt). George Mall 3pm.
- Had to pull my child out of the way of a speeding cyclist. When I challenged them they were very rude. George Mall 11.00
- Rode straight into me. He wasn't looking where he was going. George Mall 12.00

**vii) Characteristics of the survey sample**

Q12. Do you have any registered illness or disability that prevents you from cycling?

	Percent	
	Cambridge	Hull
Yes	4	5
No	96	95
		Salisbury
		13
		87

Q13. Do you have access to a bicycle you ride yourself?

	Percent	
	Cambridge	Hull
Yes	63	56
No	37	44
		Salisbury
		65
		35

Q14. How much do you agree with each of the following statements? (Asked of all those with access to a bike)

	Cambridge		Hull		Salisbury	
	Cambridge	Hull	Cambridge	Hull	Salisbury	Salisbury
For me personally cycling is a convenient form of transport	1.9	2.1	1.9	2.1	2.6	2.6
Cyclists should be given more priority in towns and cities, even if this makes things more difficult for car drivers	2.6	2.2	2.6	2.2	1.9	1.9

1= strongly agree, 5 = strongly disagree

Q15. Imagine you needed to travel about 2 miles, the weather was fine, and you had nothing to carry. Would you....?  
(Asked of all with access to a bike. Percentages are of all those with access to a bike. Percentages of all respondents given in brackets)

	Cambridge	Hull	Salisbury
Not even consider using a bike	7 (4)	7 (4)	10 (6)
Realise you could use a bike but not actually do it	8 (5)	13 (7)	3 (2)
Think seriously about the pros and cons of cycling but rarely do it	10 (6)	6 (3)	2 (1)
Try cycling on some occasions	12 (7)	36 (19)	29 (17)
Cycle quite often	27 (16)	13 (7)	24 (14)
Almost always cycle	38 (22)	25 (13)	31 (18)

Q16. Occupation of chief wage earner

	Percent		
	Cambridge	Hull	Salisbury
Senior managerial, administrative or professional	15	7	21
Junior managerial, administrative or professional/ supervisory or clerical	34	40	28
Skilled manual	16	26	22
Semi-skilled or unskilled manual	22	15	26
Student, housewife/husband	11	6	2
Unemployed	3	6	1

Q17. Age

	Percent		
	Cambridge	Hull	Salisbury
Under 18	12	8	11
18-24	22	21	5
25-39	22	22	32
40-59	30	24	26
60 or over	15	24	26

Q18. Sex

	Percent		
	Cambridge	Hull	Salisbury
Male	55	51	33
Female	45	49	67

Q19. Children in household.

	Percent		
	Cambridge	Hull	Salisbury
Any under 5	6	8	13
Any 5-10	9	7	18
Any 11-16	21	12	15
None	70	76	66

viii) Final comments

Cambridge

- Should be more designated areas for cyclists e.g. cycle paths
- As a teacher, I would rather my pupils cycled in a pedestrian area
- There should be more cycle lanes
- Cycling should be promoted, but not in pedestrian areas
- Cyclists and pedestrians should be allowed to get on together
- Cyclists should give more consideration to pedestrians in a pedestrianised area
- Cyclists should not ride through a pedestrianised area. They should push their bikes
- Laws should be enforced
- Foreign students don't understand the rules
- Should be clarified which areas are for cycling
- Cyclists should be banned altogether (4 mentions)
- Should be room for both.

Hull

- There should be a designated area for cyclists in pedestrian areas (3 mentions)
- They are dangerous, especially for old people
- It would be OK for cyclists to ride in pedestrianised areas if there was a cycle lane
- Cyclists should not be allowed/ should be banned in pedestrianised areas (12 mentions)
- Generally cyclists are pretty good in these areas. It's the teenagers that can give problems
- Cyclists should comply with the Highway Code and have an audible warning (a bell)
- Cyclists should be allowed only to push their bikes in pedestrianised areas (2 mentions).
- Cyclists should have consideration for pedestrians
- If cyclists are sensible it's OK
- Cycle lanes would be a good idea in pedestrian areas.
- Cyclists should be a bit more responsible and respectful
- Some ride too fast and do handbag snatches
- Being aware as its not always signed
- Laws should be enforced
- Don't let Hull get like Cambridge
- Like to see all markings on road like near Woolworth's
- If it's controlled its OK
- They aren't considerate enough

### Salisbury

- We all have rights. I think they should share as long as there are some restrictions
- Both should get on if they are sensible
- I think they should push their bikes (3 mentions)
- More bike racks all over town
- Anything that gets cars out of the city is good
- Would help to have cycle lanes (4 mentions)
- Pedestrians should be made aware of cyclists' needs
- I think they should put a cycle way through here properly marked
- They are a nuisance
- Cyclists should take more care to avoid pedestrians and keep their speeds down
- Need to encourage more people out of their cars
- The authorities should have an awareness programme for cyclists and pedestrians
- Cyclists should not be allowed in pedestrianised area (4 mentions)
- Don't need too many restrictions, as you should encourage people to cycle
- Needs to be care on both sides
- Should not be allowed to do what is dangerous in public
- Should be a red strip on road that's for bikes only
- Cycling proficiency test should be mandatory (2 mentions)
- Laws should be enforced
- There are not that many cyclists in this area
- Generally cyclists are very responsible and considerate
- It's a nuisance but difficult to prevent
- Older people cause as many problems
- The way kids just drop their bikes outside shops
- Skateboards are more dangerous than bikes
- Generally should be allowed/ should be allowed at all times
- Should be indicated that cyclists are allowed



## Appendix C: Attitude survey – Detailed results (cyclists)

Sample Size = 150 (50 at each location). NB One survey in Cambridge covered both sites in Fitzroy Street.

### i) Visits to the Vehicle Restricted Area

Q1. What is the main purpose of your visit to this pedestrianised area today?

	Percent		
	Cambridge	Hull	Salisbury
Shopping	66	66	69
Going to work	18	12	11
Going home from work	4	2	7
Going to school/ college/ university	0	2	4
Going home from school/college/university	0	2	0
In the course of business	0	0	0
Socialising/meeting friends	2	4	4
Personal business	8	12	2
Leisure	2	0	2

Q2a. About how often do you cycle in or through this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
More than once a day	6	14	13
About once a day	30	11	20
Several times a week	20	41	47
About once a week	26	19	7
About once a fortnight	6	8	2
About once a month	8	3	11
Less than once a month	4	5	0

Q2b. Do you ever walk in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	78	92	82
No	22	8	18

Q2c. About how often do you walk in this pedestrianised area? (Percentage is of total sample)

	Percent		
	Cambridge	Hull	Salisbury
More than once a day	2	4	2
About once a day	14	8	11
Several times a week	22	38	31
About once a week	30	22	29
About once a fortnight	4	6	4
About once a month	4	8	2
Less than once a month	2	4	2

### ii) Attractiveness of the Vehicle Restricted Area

Q3. Is there anything about this pedestrianised area that makes it unattractive?

	Number of mentions		
	Cambridge	Hull	Salisbury
Quality of shops	4	1	1
Lack of facilities for cyclists	5	3	0
Litter/dog mess	4	4	2
Having to avoid pedestrians	0	3	0
Crowds/busy	6	0	0
Surfaces	0	2	0
Nothing	26	14	39

Q4. Other mentions:

Cambridge - Beggars/tramps, Religious groups, lighting ugly  
Hull – Graffiti, buskers, smell of drains, closed shops, traffic, not enough bike racks, no cycle paths

Salisbury – Delivery trucks, more seats needed, vehicles loading at odd hours.

### iii) Attitudes to cyclists and pedestrians sharing Vehicle Restricted Areas

Q4. How much are you bothered or concerned about pedestrians when cycling in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Very much	35	18	27
Quite a lot	27	34	36
Not very much	22	23	9
Not at all	16	23	27

5a. When you are cycling through this pedestrianised area, how concerned are you about...

	Mean concern rating*		
	Cambridge	Hull	Salisbury
Pedestrian movements being unpredictable	2.1	3.0	1.8
Pedestrians blocking your way	3.1	3.8	2.8
Small children not being properly supervised	2.4	3.1	1.9
Elderly or infirm people	2.6	3.1	2.2
Not knowing whether pedestrians or cyclists have priority	3.1	3.3	3.0

\* 1 = very concerned, 5 = not at all concerned

Q5b. What other problems are caused by sharing this area with pedestrians?

Cambridge

- Pedestrians shouting at you after 16.00
- Pedestrians don't always know the rules that relate to cyclists
- Difficult if the area is crowded
- Pedestrians are not aware that cyclists can ride in this area
- Pedestrians getting hurt in accidents (4 mentions)
- Cyclists should be separated from pedestrians
- If all people paid attention there would be no problem at all/ people don't pay attention (3 mentions)
- Some cyclists do not walk with their cycles between 10.00 and 16.00. They still cycle
- People get stressed with everyone getting in each other's way
- It should be one or the other
- No cycle lanes
- Knowing the times of sharing
- Cycling during restricted periods
- Enforcement

Hull

- It's difficult to avoid pedestrians
- Pedestrians not looking where they are walking (3 mentions)
- Congestion
- Safety of pedestrians
- Younger people don't care for anyone
- Pedestrians walk everywhere
- Riding too fast
- Conflict of right of way
- Lack of respect is the cause

Salisbury

- People with dogs, dogs barking and chasing bikes (2 mentions)
- Accidents
- Misunderstandings about who should be here
- Tables and chairs outside cafes getting further into the way
- When the Morris dancers are here you can't push your bike through the crowds
- No real designated lane for cyclists but difficult to achieve as pedestrians stray into them
- People seem unaware that this is part of the Wiltshire cycle-way. Ground should be marked here as elsewhere with cycle symbol then the cyclist can point to it
- As a cyclist I am willing to get off my bike and walk when it is busy
- Needs to be clarified if cycling is allowed here or not
- Should always push bikes
- Tell us to get off our bikes. On the roads we get problems. We can't win
- More clear who has priority and clear signs to say if you can or can't cycle
- Young people on bikes weave in and out of pedestrians and give cyclists a bad name. Cyclists shouldn't be allowed to go through here
- Where it joins the traffic area its dangerous. Can't walk with a bike.

Q5c. Do you think cyclists generally have consideration for pedestrians in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	40	35	49
No	44	53	22
Don't know	16	12	29

Q5d. Do you think pedestrians generally have consideration for cyclists in this pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	18	26	18
No	66	61	76
Don't know	16	13	7



Q6. How much do you agree with each of the following statements?

	Mean agreement rating*		
	Cambridge	Hull	Salisbury
I have mixed feelings- I don't like sharing pedestrian areas but it's dangerous in traffic	2.4	2.4	2.0
In pedestrian areas cyclists of school age cause the most problems	3.0	2.7	2.4
I think there is a real risk of a pedestrian being injured by me as a cyclist in this pedestrian area	3.5	3.3	4.1
It is fair and reasonable to allow cyclists in this pedestrianised area	2.6	3.2	2.5
The majority of cyclists in this pedestrian area behave responsibly	2.6	2.7	1.8
I always obey the road traffic signs	2.0	2.1	2.3
Cyclists should be made to give way to pedestrians in pedestrianised areas	1.7	1.8	1.7

\* 1 = strongly agree, 5 = strongly disagree

Q7a. Suppose a new pedestrian area like this was being made to be shared by pedestrians and cyclists, but with some restrictions on cyclists. Would you prefer the restrictions to be.....?

	Percent giving restriction as first choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	6	7	7
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	66	61	76
Allow cyclists in only at certain times of the day	14	11	2
Make cyclists give way to pedestrians	12	15	13
Don't know/ can't say	2	6	2

	Percent giving restriction as second choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	22	22	35
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	14	15	14
Allow cyclists in only at certain times of the day	34	26	2
Make cyclists give way to pedestrians	26	24	47
Don't know/can't say	4	13	2

	Percent giving restriction as third choice		
	Cambridge	Hull	Salisbury
An 8mph speed limit for cyclists	35	26	24
Use markings and signs to show a strip where cyclists should ride, but without speed restriction	8	9	9
Allow cyclists in only at certain times of the day	12	4	24
Make cyclists give way to pedestrians	31	30	38
Don't know/can't say	14	30	6

Q7b. What other restrictions would you like on cyclists in pedestrian areas?

Cambridge
<ul style="list-style-type: none"> <li>- Only allowed to cycle at certain times</li> <li>- For cyclists to push their bikes, not to cycle (2 mentions)</li> <li>- If there is an accident it should be the cyclist's responsibility</li> <li>- Single file cycling</li> <li>- Marked cycle path</li> </ul>

Hull
<ul style="list-style-type: none"> <li>- They should not be allowed to cycle in pedestrian areas (2 mentions)</li> <li>- Cyclists should only walk with cycles in pedestrian areas (2 mentions)</li> <li>- I would ban cyclist from these areas</li> <li>- Cycle lane</li> <li>- Complete ban walking or riding (4 mentions)</li> </ul>

Salisbury
<ul style="list-style-type: none"> <li>- Separate areas for pedestrians and bikes. Pedestrians wander into cycle ways</li> <li>- More cycle tracks (2 mentions)</li> <li>- Depends on area</li> <li>- A 5-6 mph speed limit if busy</li> <li>- Make cyclist use bells. No bells on bikes (2 mentions)</li> <li>- Marking out cycle-ways is best idea and includes a speed restriction</li> <li>- They should push their bikes (2 mentions)</li> <li>- The pedestrian flow puts a natural restriction on cyclists through here. Responsible cyclists will give way</li> <li>- Barriers on cycle lanes</li> <li>- Can't mix it. It has to be pedestrians or not</li> <li>- Larger signs so they can be seen</li> </ul>

**iv) Banning cyclists from Vehicle Restricted Areas**

Q8a. Suppose cyclists were to be banned from pedestrian areas during the day to protect shoppers, but not in the morning or afternoon, so they could cycle through them to and from work. What time would you say is the time in the morning after which cyclists should be banned from the area?

Time after which cyclists should be banned in the morning	Percent		
	Cambridge	Hull	Salisbury
8.00 – 8.59	2	11	13
9.00 – 9.59	27	42	45
10.00 – 10.59	61	40	32
11.00 – 11.59	9	4	10
12.00 – 12.59	2	0	0

Q8a. What time would you say is the time in the afternoon or evening after which cyclists could be allowed back into the area?

Time after which cyclists could be allowed back into the area	Percent		
	Cambridge	Hull	Salisbury
14.00 – 14.59	2	4	0
15.00 – 15.59	9	22	39
16.00 – 16.59	61	38	32
17.00 – 17.59	25	24	19
18.00 – 18.59	2	9	7
19.00 – 19.59	0	2	3

Q8b. Do you think it is a good idea to ban cyclists from this pedestrian area for part of the day?

	Percent		
	Cambridge	Hull	Salisbury
Yes	60	58	29
No	36	38	71
Don't know	4	4	0

**v) Knowledge of signs**

Q9a. Do you think people are allowed to ride bicycles in areas covered by these signs? SHOW CARD

	Yes	No	Don't know	Percent		
				Cambridge	Hull	Salisbury
A – white bicycle on blue ground	Yes	No	Don't know	88	84	98
Cycle route-correct answer is YES				6	10	0
B – black m/cycle and car on white with red border 'except for access'	Yes	No	Don't know	84	48	58
No motor vehicles-correct answer is YES				16	40	29
C – white line on red ground	Yes	No	Don't know	0	12	13
No entry-correct answer is NO				10	6	7
D – black bicycle on white with red border	Yes	No	Don't know	84	88	87
No cycling-correct answer is NO				6	6	7
E – white with red border 'No vehicles'	Yes	No	Don't know	18	32	13
No vehicles-correct answer is NO				76	64	84
	Yes	No	Don't know	6	4	2
	Yes	No	Don't know	30	8	13
	No	No	Don't know	60	68	60
	Don't know	Don't know	Don't know	10	24	27

Q9b. Do you think people are allowed to push bicycles in an area covered by this sign? (Percentages are of all answering 'NO' at E above)

	Percent		
	Cambridge	Hull	Salisbury
Yes (correct answer)	53	58	88
No	19	27	0
Don't know	28	15	12

**vi) Reported incidents between cyclists and pedestrians in pedestrianised areas.**

Q10a. Have you ever seen or been involved in an incident between a cyclist and a pedestrian in a pedestrianised area?

	Percent		
	Cambridge	Hull	Salisbury
Yes	10	14	11
No	88	86	89

Q10b. Could you describe the incident?

Cambridge

- City centre 16.00. Cyclist knocked a pedestrian down. He was going too fast
- Pedestrian giving me a hard time after 16.00 when I was allowed to ride

Hull

- Whitefriargate 14.00 Pedestrian was not looking where she was going. She walked straight into the path of a cyclist.
- Outskirts of city 8.00. Pedestrian was trying to stop me riding my bike.
- King Edward St 11.00.00. I was free-wheeling and someone was being silly and stepped in front of me. I put on the brakes and fell off & broke my arm
- Middy, riding past and caught a shopper's bag
- Told to get off bike – pedestrians only.

Salisbury

- He was pushing his bike. Someone got in the way and then got cross and kicked his bike.
- Ran into a man walking along
- An argument when a bloke told us to get off and push our bikes. He was 40ish

**vii) Characteristics of the survey sample**

Q11. How much do you agree with each of the following statements?

	Cambridge	Hull	Salisbury
For me personally cycling is a convenient form of transport	1.1	1.1	1.1
Cyclists should be given more priority in towns and cities, even if this makes things more difficult for car drivers	1.6	1.6	1.6

\* 1= strongly agree, 5 = strongly disagree

Q12. Imagine you needed to travel about 2 miles, the weather was fine, and you had nothing to carry. Would you....?

	Cambridge	Hull	Salisbury
Not even consider using a bike	0	0	0
Realise you could use a bike but not actually do it	2	4	0
Think seriously about the pros and cons of cycling but rarely do it	2	2	0
Try cycling on some occasions	4	8	4
Cycle quite often	4	12	18
Almost always cycle	88	74	78

Q13. Occupation of chief wage earner

	Percent		
	Cambridge	Hull	Salisbury
Senior managerial, administrative or professional	14	4	29
Junior managerial, administrative or professional/ supervisory or clerical	38	20	29
Skilled manual	10	32	24
Semi-skilled or unskilled manual	22	28	16
Student, housewife/husband	10	6	0
Unemployed	4	10	2

Q14. Age

	Percent		
	Cambridge	Hull	Salisbury
Under 18	8	2	16
18-24	18	10	9
25-39	28	30	13
40-59	26	28	38
60 or over	20	30	24

Q15. Sex

	Percent		
	Cambridge	Hull	Salisbury
Male	46	69	59
Female	54	31	41



## Q16. Children in household.

	Percent		
	Cambridge	Hull	Salisbury
Any under 5	2	0	9
Any 5 –10	2	6	12
Any 11-16	10	8	19
None	90	88	64

## viii) Final comments

Cambridge

- Insufficient support is given to cyclists in Cambridge. Cyclists are allowed to cycle in the pedestrianised area after 16.00, but not many pedestrians know this
- Cycling signs should be more visible (2 mentions)
- Pedestrianised areas should have designated cycle routes (5 mentions)
- Cyclists and pedestrians should have respect for each other
- Should be one or other
- Stop it
- The authority should enforce restrictions that are already in place
- People need to change their attitude
- Get a lesson from Holland

Hull

- I think cycling is the most civilised form of transport. It should be encouraged
- All cyclists should push their bikes in pedestrianised areas unless there is a designated area for cyclists
- Pedestrians should be more tolerant with cyclists
- There should be more cycle paths in pedestrian areas (7 mentions)
- It should not be allowed (3 mentions)
- There should be more facilities for parking cycles
- Cyclists should push their bikes at all times (2 mentions)
- There should be a designated area for cyclists
- There should be more cycle racks
- This is the only city I know where the cycle facilities are inadequate
- Should be banned all the time (3 mentions)
- Should not cycle
- The police don't use the local bylaw £20 fine
- More enforcement
- Cycling should be encouraged by more cycle routes



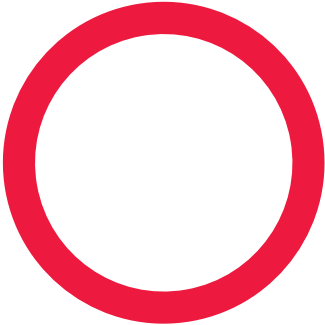

Salisbury

- Shouldn't be banned but an agreement must be made – split area/speed limits
- Its dangerous, no-one goes in a straight line. Cyclists in a defined area would be good
- Make it clearer with more markings
- Need to make pedestrians and cyclists aware of each other. Cyclists should have a bell
- Pedestrians go in cycle lanes
- There should be more cycle racks and they should be right at the other end of the precinct
- I like the idea that there are facilities for bikes, but I would rather people pushed their bikes through pedestrianised areas
- Just have to be courteous and careful
- I regret the attitude of some youthful cyclists. It spoils it for us all
- Cycle paths are very patchy – they keep disappearing
- It should be made much clearer where we can cycle. Stop using the pedestrian area
- Should push bike through the pedestrianised area (3 mentions)
- There should be more cycle lanes to get to them
- More places to leave bikes/ more cycle racks
- Needs more research
- Needs more, clear positive signing so pedestrians know what is allowed and what is not
- Need barriers along the cycle lanes
- Need more cycle lanes
- Not always clear where you can cycle and where you can't, which confuses both cyclists and pedestrians
- Should be more convenient i.e. a cycle lane
- Should not cycle if pedestrianised (2 mentions)
- Should have separate areas for walking and cycling
- Too many advertising signs in the middle of a pedestrian area- dangerous for both pedestrians and cyclists.
- Have more areas just for cyclists

## Appendix D: Traffic signs

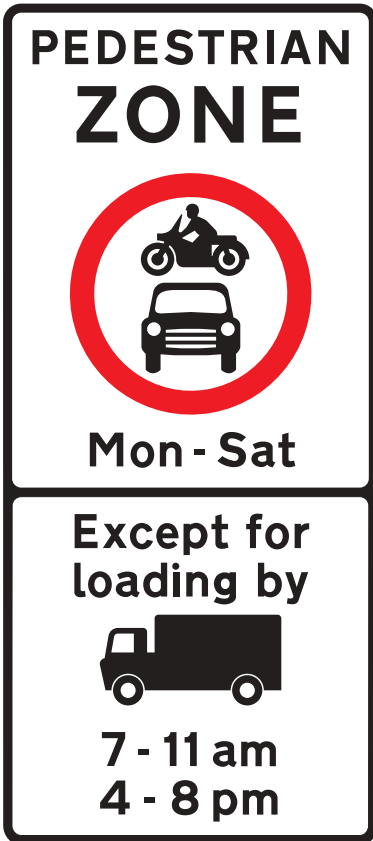
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This report contains a number of references to signs that correspond to diagram numbers within The Traffic Signs Regulations and General Directions (TSRGD) 2002. For the convenience of readers, examples of the relevant signs, with their diagram number, are reproduced as follows:

	TSRGD Diagram No.		TSRGD Diagram No.
	616		618.1
	617		618.2

TSRGD  
Diagram No.

TSRGD  
Diagram No.



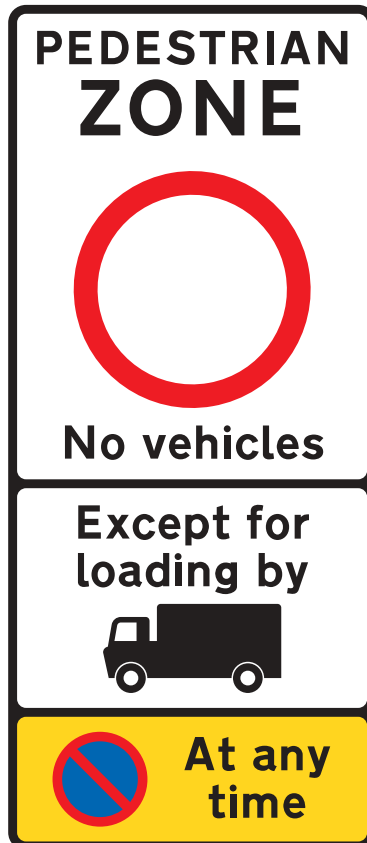
618.2  
(Alternative)



618.3  
(Alternative)



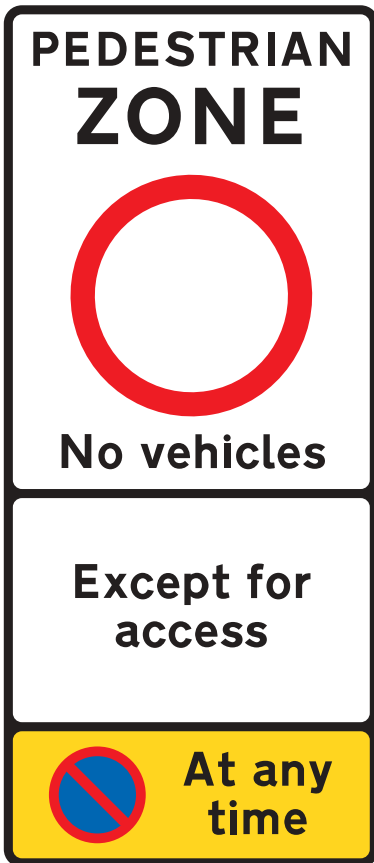
618.3



618.3A

TSRGD  
Diagram No.

TSRGD  
Diagram No.



618.3A  
(Alternative)



951



619 with 620



955



## Abstract

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Vehicle restricted areas (VRAs) or 'pedestrian areas' in town centres are sometimes important routes for cyclists. However, cycling is prohibited in many VRAs on the grounds of pedestrian comfort and safety. TRL studied the behaviour of 2,220 cyclists at sites in Cambridge, Hull and Salisbury where cycling is permitted for part or all of the day. TRL also interviewed 300 pedestrians and 150 cyclists at these sites to obtain additional details about behaviour and attitudes. The report presents data on cycling speeds, dismounting and pedestrian flows and identifies those factors that significantly influence cyclist behaviour. It also shows which types of cyclists are most likely to ignore cycling bans and to cycle fast. The interviews reveal varying levels of acceptance by pedestrians of cycling in VRAs, and indicate that some injurious incidents occur. Conclusions are presented about how the physical layout of the VRA and other factors can affect pedestrian safety and comfort. The report does not endorse or reject cycling in VRAs, but presents information that may assist with appropriate local regulation and design.

## Related publications

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TRL371 *Alternative routes for cyclists around pedestrian areas* by D G Davies, T J Ryley and Halliday M E. 1999 (price £25, code E)

TRL287 *Delineation for cyclists and visually impaired pedestrians on segregated, shared routes* by T A Savill, C Gallon and McHardy G. 1997 (price £25, code E)

CR173 *Cyclists' use of pedestrian and cycle/pedestrian crossings* by P Trevelyan and Ginger M. 1990 (price £20, code C)

PR15 *Cycling in pedestrian areas* by P Trevelyan and Morgan J M. 1993 (price £35, code J)

CT15.2 *Planning for pedestrians and cyclists update (1999-2001) Current Topics in Transport: selected abstracts from TRL's Library Database* (price £20)

Prices current at August 2003

For further details of these and all other TRL publications, telephone Publication Sales on 01344 770783, or visit TRL on the Internet at [www.trl.co.uk](http://www.trl.co.uk).