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Contents

Summary	1
1 Introduction	3
1.1 Background	3
2 Understanding Shared Space	5
2.2 Shared Space Schemes	6
2.3 Vision, Purpose and Actions	8
2.4 Level Surfaces	10
2.5 Performance Measurement	11
3 Evidence	13
3.1 Introduction	13
3.2 Economic activity and Property Values	13
3.3 Flows of users across the street	14
3.4 Opinions of users	15
3.5 Visual amenity	20
3.6 Use of facilities	20
3.7 Proportion of pedestrians moving freely	20
3.8 Delay to pedestrians crossing the space	21
3.9 Pedestrian flow counts	21
3.10 Nature of Pedestrian Activity	22
3.11 Space available to pedestrians	23
3.12 Propensity for drivers to give way to pedestrians	23
3.13 Reduction in traffic flow	25
3.14 Reduction in traffic speed	25
3.15 Casualty Risk	26
3.16 User comfort	33
4 Knowledge Gaps	35
4.1 Introduction	35
4.2 When Do Drivers Give Way?	35
4.3 How Does Sharing Work?	35
4.4 What Happens to Pedestrian Behaviour?	36
4.5 How Can Shared Space Be Made More Navigable?	37
4.6 Next Steps	37
5 Summary and Conclusions	38
Annex A Design	41
A1. Emerging Issues	41

Tables

Table 2.1 Structured Interpretation of Schemes	9
Table 2.2 Suggested Shared Space Performance Indicators	12
Table 3.1 Characteristics of 55 Respondants	18
Table 3.2 Disabled People Interviewed	19
Table 3.3 Casualty Records of a Sample of Dutch Simplified Street Schemes Source Quemby and Castle 2006	28
Table 3.4 Casualty Performance of Three Shared Space Schemes in the Netherlands, reproduced from Gerlach et al (undated)	29
Table 3.5 Casualty Performance of Historic Core Zone Schemes in England Source: Wheeler	30
Table 3.6 Summary of Early Monitoring Results from the Ten Mixed Priority Routes Source DfT, 2008, Mixed Priority Routes Road Safety Demonstration Project –Summary Scheme Report	31

Figures

Figure 2.1 Two Dimensional matrix of segregation/interaction	6
Figure 2.2 Place/Movement typology of streets. Source Manual for Streets	7
Figure 2.3 Chertsey Road, Woking. Level surface with delineation by bollards, planters and surface differences	11
Figure 3.1 Disabled people's responses to: "Do you feel this Home Zone environment is better or worse than a traditional residential street environment in terms of overall navigation?"	16
Figure 3.2 Disabled people's responses to: "Do you feel this Home Zone environment is better or worse than a traditional residential street environment in terms of overall safety?"	16
Figure 3.3 Taken from Palmblad, A and Sari, W, Shared Space in Sweden, Presentation 2009	24

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Introduction

This report has been prepared for the Department for Transport as an early output from a project to develop evidence-based design guidance on Shared Space highway schemes, including those which feature a level surface without kerbs. This report summarises the results of an Appraisal Stage in which available evidence on the performance of Shared Space has been collated and reviewed.

The Appraisal Report has been based on:

- A review of literature
- Interviews with people using Shared Space schemes
- Discussions with UK local authorities that have implemented Shared Space schemes
- Observation during site visits.

Definitions

Shared Space is a relatively new term and a number of alternative terms are in currency. In this report we use the following definitions:

- Shared Space: a street or place accessible to both pedestrians and vehicles that is designed to enable pedestrians to move more freely by reducing traffic management features that tend to encourage users of vehicles to assume priority.
- Level surface: a street surface that is not physically divided by kerb or level differences into areas for particular uses. Level surface is a feature of some Shared Space schemes. Note that not all parts of a level surface are necessarily shared (accessible to vehicles) as other features, such as street furniture, may physically prevent vehicle access.

Headline Conclusions

This report draws a number of conclusions. In doing so it is acknowledged that there is limited research available, particularly into the operation of Shared Space schemes in the UK. Consequently these conclusions are provisional, pending further research. It is also necessary to understand that Shared Space schemes are highly particular in their contexts and design and that generic conclusions need to be treated with caution:

- Shared space schemes need to be understood as tactics designed to improve quality of life, visual amenity, local economic performance and environmental quality. As they tend to be applied in the UK, they are not primarily intended as traffic schemes but are designed to assert the function of streets as places and reduce the social, environmental, psychological and severance effects of motorised traffic.
- The design of Shared Space streets is inevitably a compromise between the needs of a range of users which seeks to accommodate rather than exclude particular uses.

- There is sufficient evidence to suggest that well-designed schemes in appropriate settings can bring benefits in terms of visual amenity, economic performance and perceptions of personal safety. These benefits must be set against some disbenefits to some users (discussed below) and evidence that the perception of road safety can be reduced among some users.
- There is little evidence in the UK of a consistent casualty reduction benefit from Shared Space schemes although this may be in part because many schemes are recently completed with little performance monitoring data.
- There is no evident safety disbenefit at UK schemes - casualty numbers tend to stay relatively constant, although they are generally low prior to scheme implementation. The limited data available on user flow suggests that the relatively constant casualty numbers may be in the context of significant increases in the flows of pedestrians and cyclists, suggesting a reduction in risk. There is some evidence from Dutch research that casualty numbers may be greater in Shared Space schemes with high vehicle flows compared to traditional layouts, although no equivalent data is available from the UK.
- Surveys of users tend to indicate that perceptions of a street improve when Shared Space is implemented. This may be related to the enhanced quality and visual amenity. Pedestrians tend to recognise that Shared Space is less than their ideal of full pedestrianisation but generally tolerate the presence of vehicles.
- Level surfaces in Shared Space can create specific difficulties for some visually impaired people. It is also suggested, although the evidence is extremely limited, that this may also be the case for other vulnerable groups such as young children and people with learning difficulties. Conversely a level surface is generally appreciated by mobility impaired people. In stating these generic responses it is important to acknowledge that people cannot be stereotyped by their disability and that individual responses vary significantly.
- Shared Space schemes featuring a level surface seem to be most acceptable to people of all abilities when a clearly defined part of the space is free from motorised vehicles. There is some evidence that such schemes are considered safer and more readily navigable by disabled people than conventional streets although this is stated tentatively and the detailed design of schemes appears to be highly influential on user responses.
- There is very little evidence about driver behaviour in Shared Space schemes in the UK. Overseas evidence appears to suggest that drivers do concede priority to pedestrians and cyclists but the influence on their behaviour of different legal frameworks and cultural influences cannot be ruled out.

In summary Shared Space schemes do appear to be a beneficial design approach for application in appropriate settings. Shared Space describes a design approach rather than a design type characterised by 'standard' features. Accordingly each scheme needs to be carefully developed with full reference to the context and setting. The full benefits of Shared Space are likely to be achieved when vehicle flows are relatively low, vehicle speeds are effectively controlled and there are features in the space that encourage pedestrian activity. Not all pedestrians are comfortable mingling with vehicles and the provision of clearly defined space in which they can be confident that they will not encounter a vehicle is likely to be beneficial.

1 Introduction

1.1 Background

- 1.1.1 Shared Space is an approach to highway design predominantly aimed at changing the impact of motor traffic in places used by pedestrians. Shared spaces are generally introduced with a range of purposes including:
- improving the urban environment ;
 - giving people freedom of movement rather than instruction and control ;
 - improving the ambience of places ;
 - enhancing social capital ; and
 - enhancing the economic vitality of places.
- 1.1.2 A characteristic of many Shared Space schemes, which highlights the departure from conventionally designed streets, is the minimal use of traffic signs, road markings and other traffic management features. With less, or no, traffic management or clear indication of priority, motorists are encouraged to recognise the space as being different from a typical road and to react by driving more slowly and responding directly to the behaviour of other users (including other motorists) rather than predominantly to the traffic management features. This approach takes place against a backdrop of concern at the proliferation of features such as pedestrian guardrailling, traffic signs and highway regulation which, it is argued, can tend to reduce users' understanding of the complexity of the street environment and their personal responsibility for safe and appropriate behaviour.
- 1.1.3 Some Shared Space schemes also feature a level surface (see 2.4), although not all will do so. In these cases, kerbs are omitted and there is no level difference between pedestrians and vehicular traffic. The aim of reducing the definition of areas for pedestrians and vehicles is to indicate that the street is meant to be shared equally by all users of the highway. The intention is that implied priority for motor vehicles is removed, as is a physical, and psychological, barrier to pedestrians using the full width of the highway. Ideally designers intend that on a level surface, people should be able to not only cross the street wherever they want to but also occupy the street. Motorists are expected to adapt their behaviour to that of other road users, driving slowly and giving way as appropriate.
- 1.1.4 Shared Space and level surface schemes on the continent have recently been widely publicised in the UK, generating significant interest among UK local authorities and practitioners in the potential for Shared Space approaches to civilise streets. However, Shared Space and level surface schemes are not new design concepts. Level surfaces have been used in residential areas for some time, and Exeter High Street is an example of a UK city centre location redesigned as a Shared Space around thirty years ago. Many rural settlements and historic streets throughout the UK have always had a level surface and often there is insufficient space between buildings to accommodate separate areas for vehicles and pedestrians.
- 1.1.5 As Shared Space schemes have increased in number and prominence, concerns have been raised about the possible risk to pedestrians mixing with vehicles in the absence of features such as signalised crossings, barriers and kerbs. There are concerns that some people,

particularly blind or partially sighted people, children, people with restricted mobility and people with learning difficulties may find Shared Space difficult to use and be put at increased risk.

1.1.6 The purpose of this report is to assess the current state of knowledge on Shared Space, including schemes that feature a level surface, and establish whether a case can be made for the concept or not. It is the first output of a comprehensive, evidence-based research project for the Department for Transport (DfT) which is expected to finish in 2011.

1.1.7 This report is based on four activities:

- A literature review;
- Consideration of a sample of existing Shared Space schemes in the UK, drawing on the experience and knowledge of the relevant local authorities and collating such monitoring data as is available;
- Site visits to Shared Space schemes; and
- Qualitative research in the form of interviews to record users' experience and views.

The remainder of this report is structured in the following Chapters:

Chapter 2 Understanding Shared Space – Considering Shared Space and level surface schemes conceptually and identifying potential indicators of their benefits and disbenefits.

Chapter 3 Evidence – Reviewing the available evidence of the operation of Shared Space schemes.

Chapter 4 Evidence Gaps

Chapter 5 Conclusions

Annex 1 Identifies emerging issues for the design of Shared Space schemes

2 Understanding Shared Space

- 2.1.1 Defining Shared Space is not straightforward and a number of descriptive terms are in common use to describe streetscape enhancement and traffic management schemes. Apart from 'Shared Space' itself, terms used in connection with the concept include 'shared surface', 'simplified streets', 'shared streets', 'naked streets', 'de-cluttering', 'single surface' and 'level surface'. They do not necessarily describe the same thing or approach and the lack of a precise common vocabulary may be contributing to a lack of clarity in discussion on the topic.
- 2.1.2 Such terms are variously used to describe the infrastructure or the desired behaviour of users - some are used to describe both. A critical distinction between these two categories is that physical and regulatory infrastructure is relatively fixed while the behaviour of users is transitory and can change according to the moment, the individuals involved and the prevailing situation.
- 2.1.3 With the exception of those terms that describe a surface without kerbs, none of the terms describe a particular form or configuration of infrastructure. Many are in fact descriptions of aspects of a scheme (e.g. de-cluttered), rather than of the scheme itself, with an implicit comparison with conventional highway layouts. For the purposes of this project we are adopting the following working definitions:
- Shared Space: a street or place accessible to both pedestrians and vehicles that is designed to enable pedestrians to move more freely by reducing traffic management features that tend to encourage users of vehicles to assume priority; and
 - Level surface: a street surface that is not physically divided by kerb or level differences into areas for particular uses. Level surface is a feature of some Shared Space schemes. Note that not all parts of a level surface are necessarily shared by pedestrians and vehicles as other features, such as street furniture, may physically prevent vehicle access.¹
- 2.1.4 By reducing demarcation and signing compared to conventional street layouts, people are presented with an environment where the infrastructure does not provide as much indication as to how other users are likely to behave. It is hypothesised that this requires them to interpret the behaviour of others and interact accordingly, rather than having their movement patterns and priority largely dictated by the infrastructure, as generally happens in a conventional street. Users are expected to interpret the space flexibly according to who else is present and what those people are doing. The amount of interaction and cooperation between users will vary depending on the individuals concerned and the circumstances at any particular time.
- 2.1.5 Infrastructure-defined behaviour and user-defined behaviour need to be considered separately as well as in conjunction with each other. The relationship between these two aspects of street design can be expressed in two-dimensions, as illustrated in Figure 2.1. The

¹ This partial demarcation of 'Shared Space' is common in European practice. A review of Shared Space by German and Dutch academics noted that "Shared Space in practice is not a synonym for "Shared and Open Space" in theory" Gerlach, J, Boenke, D, Leven, J and Methorst, R, Sense and Nonsense of Shared Space, Undated.

vertical axis represents infrastructure-defined behaviour in terms of the demarcation within a street into spaces for particular user-groups. The horizontal axis represents user-defined behaviour in terms of interaction between modes.

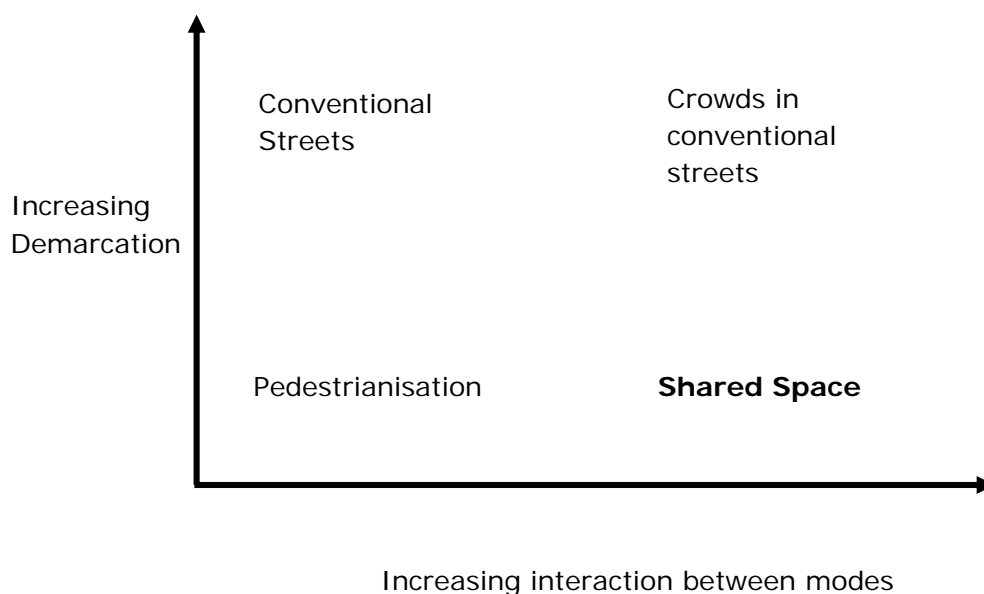


Figure 2.1 Two Dimensional matrix of segregation/interaction

- 2.1.6 For the purposes of this project, a street is considered to be a Shared Space when vehicle-pedestrian segregation is low and users begin to interact with each other, rather than respond to the more defined indications of priority inherent in conventional layouts. This project primarily considers Shared Space schemes in built-up areas such as high street types of environment, as these are considered to be more challenging to design when trying to cater for all classes of user. It does not focus on Shared Space in Home Zones or rural village streets (which often do not have kerbs), although some aspects of those situations are relevant.

2.2 Shared Space Schemes

- 2.2.1 Current DfT thinking on street design is set out in the Manual for Streets (MfS). MfS recommends that most streets in urban areas should be thought of in terms of a balance between their functions as places and as corridors for movement. This is represented in another two-dimensional matrix (Figure 2.2) whereby different categories of streets are expected to fulfil different combinations of the place and movement functions. Shared Space can be considered in the context of this matrix.



Figure 2.2 Place/Movement typology of streets. Source Manual for Streets

- 2.2.2 Shared Space represents a deliberate effort to reassert the place status of streets while maintaining their link status. It aims to achieve this by minimising the paraphernalia associated with vehicle movement and may introduce features such as seating, public art etc. to influence the behaviour of street users and thereby enhance amenity and facilitate place-based activity.
- 2.2.3 This interpretation is in line with the way in which local authorities in the UK contacted in the Appraisal stage of this project have been applying Shared Space. Various Shared Space schemes have been introduced to create localised environmental improvements, to attract pedestrians to use streets, to create civic spaces and to support the reconnection of isolated districts within urban areas by reducing barriers to pedestrians. This change in the status and meaning of the street is also evident in the responses of pedestrians interviewed during the qualitative research element of the Appraisal stage – some describing the street as one where they now come to spend time, a street which is a destination in its own right: a place, as well as a corridor.
- 2.2.4 Many of the objectives of local authorities in implementing Shared Space schemes could also be addressed through pedestrianisation. For practical purposes however in some settings Shared Space may be more desirable than pedestrianisation. Shared Space can maintain access for public transport, cyclists, disabled people reliant on motorised vehicles, passing trade and delivery vehicles that would otherwise be excluded. It can also reduce the network impacts of closing a link entirely to traffic. Shared Space addresses a particular problem which can affect some pedestrianisation schemes, where the absence of vehicular traffic can lead to them becoming lifeless places at night. This can give rise to personal security issues.
- 2.2.5 The second important implication of such a Place/Movement analysis of Shared Space is that it acknowledges the need to influence the way users move within and through the area. In general, the 'place' users of a street are pedestrians, whereas all user groups make use of a street's movement function. Reducing the emphasis on movement by minimising the use of traffic management measures requires that vehicle users share the space with pedestrians on a more equitable basis.

- 2.2.6 In our analysis sharing is likely to take place, in many instances, only if drivers are willing to share – individual pedestrians cannot physically assert priority over a driver who has assumed right of way. The relationship in a Shared Space therefore cannot always be described as entirely negotiated.
- 2.2.7 Neither is it clear that active communication is required between users. It has been suggested that eye contact with other users is important in Shared Space, and some participants in our survey stated that they sought to establish it. However, in some site observations we noted a tendency for vehicle users to react not to direct communication but to the anticipated behaviour of pedestrians, especially when they seem unaware of the vehicle. A further observation from site visits is that group behaviour patterns appear to be exhibited. Drivers in platoons of vehicles seem inclined to follow the preceding vehicle without particular reference to pedestrians. Similarly pedestrians moving in groups seem to follow one another. In neither case is there clear communication between different types of user. Indeed it may be that where flows of pedestrians are sufficiently high an ordering effect is taking place whereby users of all types concede priority to those users already in the space at the time of their own arrival. This hypothesis is stated tentatively and will be considered in later stages of this project.
- 2.2.8 Notwithstanding the discussion above it may be that the level of communication between users varies between Shared Spaces that are links and those that are junctions. Research into behaviour at a junction in the Netherlands found that after its conversion to a Shared Space there was an increased use of indicators by drivers and hand signals among cyclists². This may indicate a difference between Shared Space links and junctions, with the conflicting movements at a junction providing a prompt to communication. It may also indicate that the nature of participants may influence the potential for and type of communication – it is notable that in this case the recorded communication was via formalised means that took the form of a general ‘broadcast’ of intent rather than, apparently, from individual to individual. It is not clear how pedestrians, with no formal convention of communication to other road users might broadcast their intentions at Shared Space junctions other than through their trajectory of movement.
- 2.2.9 Our assessment is that, as a necessary precondition, Shared Space schemes need to positively influence driver behaviour in order to work well. This is reflected in the way local authorities are designing Shared Space schemes. A defining characteristic of the schemes examined is that they seek to encourage drivers to slow down and give way to pedestrians (and each other) without being required to do so by signing or other highway features. The corollary of this is that the layout and its effects on the behaviour of drivers is intended to encourage pedestrians to move more freely within the space according to their own desire lines. In order to achieve these effects transition zones and gateway features may be required in order to signify to drivers that they are entering a different type of space and to give them opportunity to adjust their speed prior to encountering pedestrians.

2.3 Vision, Purpose and Actions

- 2.3.1 Developing a Shared Space scheme should not be an objective in itself but needs to be understood as a design approach that may be deployed to contribute to a wider set of

² Noordelijke Hogeschool Leeuwarden, The Laweplein Evaluation of a the Reconstruction of a Square into a Roundabout, 2007

strategic and policy objectives. Similarly, although it is necessary to influence driver behaviour in Shared Space schemes, the intervention in driver behaviour to achieve conditions favourable to pedestrians is tactical, as is the use of particular infrastructure measures such as a level surface. We conclude that it is necessary to understand Shared Space schemes in a framework that acknowledges higher level objectives as well as specific design features. The DfT's recent Local Transport Note 1/08, Traffic Management and Streetscape, proposes just such a framework of scheme Vision, Purpose and Actions. In this setting, two examples of Shared Space schemes from the sample assessed in this Appraisal are shown in Table 2.1.

Table 2.1 Structured Interpretation of Schemes

	Elwick Road, Ashford	New Road, West Bromwich
Vision	Accommodation of growth – summed up as a policy of 'mend to extend'.	Support town centre regeneration by providing a high quality civic space in the town centre suitable for flexible uses.
Purpose	The Ashford Growth Area Development Framework identified an area of significant growth to the south of the existing town centre. The purpose of the project was to transform the ring road in order to connect the existing town centre with the area of planned growth.	Redevelop the link to have the feel of an urban square in which people will want to spend time but maintain bus movement in the town centre
Actions	Slow traffic prior to entry to the scheme, use a shared level surface with minimal signing to encourage slower speed and reduce physical barriers to pedestrians	Entry treatments to the scheme, low kerb delineation of the bus link, use of seating and planting to encourage pedestrians to spend time in the space.

2.3.2 In neither of these cases should the **Actions** be seen as the defining characteristics of the scheme - they are simply the means to achieve the **Vision** and **Purpose**. This is important as it enables Shared Space schemes to be understood not as traffic management projects or safety schemes but as having a range of purposes. This is consistent with most of the examples of Shared Space reviewed thus far: schemes are typically based on a fundamental redesign of a place and tend to include enhancement of materials, changes to architecture and frontages, landscaping and other features. The control of traffic is a matter of enabling the place users to enjoy the space without excluding vehicles.

2.3.3 This approach is consistent with that set out in the DfT's Manual for Streets guidance. MfS recommends that a scheme's objectives be clearly set and these then form the basis of subsequent Quality Audit assessments throughout the design process. This approach is intended to ensure that a scheme meets its broader objectives and is not skewed by any

single perspective. Quality Audit is described as a flexible process that may include a range of individual elements including Road Safety Audit and Access Audit.

2.4 Level Surfaces

- 2.4.1 Shared Space schemes sometimes use what is often referred to as a 'shared surface', where there is no kerb or level difference to segregate pedestrians and vehicles. This is another example of a tactical intervention designed to help minimise physical and psychological barriers to pedestrian movement and influence driver behaviour by emphasising the fact that the street is not a conventional street where drivers tend to assume priority.
- 2.4.2 However, the term 'shared surface' is not necessarily an accurate description of the way the space operates. Shared surface schemes often retain some degree of designation of space using features such as planting, street furniture, surface texture and surface colour, although not all of these will necessarily be obvious to all users. These can be used to varying extents to channel vehicle movement and reserve certain areas for pedestrians (see Figure 2.3). The use of such measures may mean that a shared surface scheme is not intended to be entirely 'shared'.
- 2.4.3 Moreover 'sharing' describes a behaviour that designers intend users to exhibit but some users may be unable or unwilling to share space with vehicles. There may in fact be a tendency for vehicle and pedestrian flows to remain relatively separate under certain conditions, for example where vehicle flows are relatively high.
- 2.4.4 For these reasons we use the term 'level surface' in this report as a description of a physical feature. Level surface does not imply a behaviour, nor that the surface is undifferentiated. A level surface is not necessarily a single surface, in terms of materials and texture, nor a shared surface, in terms of undifferentiated mingling of users, see for example Figure 2.3, below, which illustrates a street that features a level surface but differentiates those parts of the streets that are shared from those from which vehicles are excluded by means of surface differences and physical features. Observation of this street suggests that while pedestrians do cross freely within the space, they tend to move along the street using the footway areas.

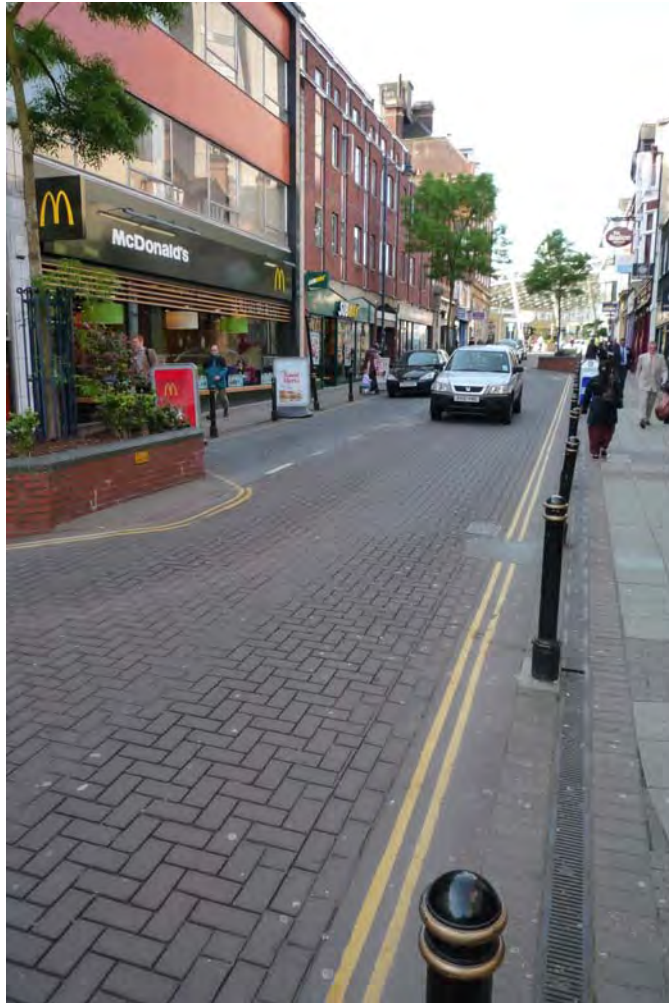


Figure 2.3 Chertsey Road, Woking. Level surface with delineation by bollards, planters and surface differences

2.5 Performance Measurement

- 2.5.1 In order to assess the operation of Shared Space schemes it is necessary to establish a suitable set of performance indicators. Given that such schemes need to be understood in terms of their higher level objectives as well as their specific highway design features, such a list of indicators is potentially wide-ranging. It is also, in principle, the case that the appropriate indicators for a given scheme should be bespoke to the specific objectives of that scheme. Nevertheless, there is a broad commonality between schemes examined that makes it possible to propose generic indicators of success or failure. Table 2.2 contains some suggested generic indicators.

Objective	Performance Indicator
Economic regeneration	Economic activity
	Property values
	Shop occupancy rates
Ease of pedestrian movement	Flows of users across the street
	Number of people using newly opened pedestrian links.
	Reduction in delay to pedestrians moving through the space
Placemaking	Opinions of users
	Visual amenity
	Use of facilities provided, e.g. seating, cycle parking
Reduce traffic dominance	Traffic flow/speed
	Space available to pedestrians
	Propensity for vehicles to give way to pedestrians
	Pedestrians free to cross at any location
Changes in pedestrian activity	Pedestrian flows
	Nature of pedestrian activity
	User comfort
Maintain or improve safety	Accident/incident rates
Inclusive design	Opinions of users and representative groups

Table 2.2 – Suggested Shared Space Performance Indicators

- 2.5.2 In summary, Shared Space schemes are designed to change the way the public highway can be used, in order to improve economic vitality, environmental quality, and quality of life. There are aspects of these aims which can be measured to assess performance. The available evidence for performance against these indicators is discussed in the next Chapter.

3 Evidence

3.1 Introduction

- 3.1.1 This section considers the generic indicators discussed in Chapter 2. It also summarises the evidence gathered at this stage of the project regarding the performance of schemes against these indicators.
- 3.1.2 Where it has been available we have specifically considered evidence from UK examples of Shared Space. Additionally we have referred to continental examples where appropriate. Interpretation of continental examples should be viewed with some caution for two reasons:
- The meaning of the term Shared Space may not be directly equivalent to its emerging use in the UK. For example several of the prominent examples from the Netherlands involve application of Shared Space principles to major traffic intersections and involve significant interaction between motorists as well as vulnerable road users. There are very few examples of this application in the UK. This may be significant as the risk in a motorist/motorist interaction is less asymmetric than in a motorist/pedestrian interaction and may thus control driver behaviour more effectively.
 - There may be different legal and regulatory contexts in other settings that would also influence road user behaviour. Examples include the ability in Swiss and French law, which is not currently lawful in the UK, to define and enforce a zone in which pedestrians have a legal priority and in which traffic speed is restricted to 20kph (12.4mph).

3.2 Economic activity and Property Values

- 3.2.1 There is some evidence in the literature that schemes to reduce traffic dominance can improve local economic performance. This may be related simply to traffic flow, for example Carley³ refers to evidence from both Leicester and York that shop vacancy rates are, all other things being equal, positively related to the flow of motorised traffic.
- 3.2.2 More recent work has assessed the relationship between a multi-variate assessment of pedestrian friendliness using the Pedestrian Environment Review System (PERS)⁴ and economic performance:
- A study conducted for CABA⁵ identified that more pedestrian-friendly environments are associated with higher rental value of retail premises.
 - Work carried out by MVA Consultancy for Design for London⁶ concluded that there is a statistical relationship between street quality and retail rental value and the value of private dwellings. The MVA study also considered the value uplift achieved by fourteen placemaking schemes (which include Shared Space schemes). It found that in twelve of the schemes the uplift in property value had been greater than the background

³ Carley, M, Sustainable Transport and Retail Vitality, Scottish Historic Burghs Association, 1996

⁴ <http://www.trlsoftware.co.uk/news/detail.asp?pid=51&iid=124>, accessed April 2009

⁵ CABA, Paved With Gold: The Real Value of Street Design, 2007

⁶ Reid, S and Shore, F, Valuing Urban Realm, Unpublished Project Report, 2008

trend or the growth in value of properties at control sites. The study also tentatively concluded that the more complete the re-orientation of the street space towards pedestrian priority, the greater the property value uplift, with properties affected by pedestrian priority schemes demonstrating an average 12% increase in value over those of the control sites in the same period.

- 3.2.3 None of the local authorities contacted in the Appraisal stage collated economic data specifically around their schemes. However, it was noted by Wiltshire County Council that shop vacancy rates in the scheme at Station Road in Tidworth had decreased contrary to the trend for comparable towns in the same area. Similarly, following completion of a historic core zone scheme in Shrewsbury the local authority identified an increase in shop rental value and a reduction in vacancy rates.
- 3.2.4 The evidence suggests that Shared Space schemes which improve the quality of the street environment can contribute to the economic vitality of a town. However, economic performance is a complex subject and Shared Space may not be responsible for delivering increases in value on its own. That said, it could be the catalyst for other aspects of a scheme to deliver economic benefits.

3.3 Flows of users across the street

- 3.3.1 A notable problem with many of the schemes assessed is the lack of pedestrian crossing counts or other analyses of paths taken by pedestrians within the space. For many schemes there is only anecdotal evidence of changes in pedestrian flow.
- 3.3.2 From the literature there is evidence from some of the Mixed Priority Route schemes of increased crossing activity. For example, following the introduction of Liverpool's MPR scheme, a significant increase in formal crossing movements⁷ was noted and counts of pedestrians crossing the road away from signalised crossings either increased or remained the same. Evidence from some of the Historic Core Zone studies is more variable⁸, with pedestrian crossing flows falling at some count points and rising at others, even within the same town.
- 3.3.3 The data so far illustrate two important points:
 - Pedestrian response to Shared Space schemes is complex and likely to be influenced by a range of factors, including the density and location of trip generators (for example York⁹ concluded that the location of trip attractors was the most significant influence on pedestrian movement patterns); and
 - Shared Space may redistribute pedestrian movements in a given centre thus making crossing counts at fixed locations an unsatisfactory method for assessing change.

⁷ DfT, Mixed Priority Routes Road Safety Demonstration Project –Summary Scheme Report. 2008

⁸ Wheeler A, Traffic Calming in Historic Core Zones: Bury St Edmunds, TRL 388, Crowthorne, 1999

⁸ Wheeler, A Traffic Calming in Historic Core Zones: Crossley Street, Halifax, TRL 288, Crowthorne 1997

⁸ Wheeler, A Traffic Calming in Historic Core Zones: High Street Route, Shrewsbury, TRL 374, Crowthorne 1999

⁹ York, I, Public Transport in Pedestrian Priority Areas, TRL PR/T/136/03, Crowthorne 2003

3.4 Opinions of users

- 3.4.1 Most published research focuses entirely on the opinions of pedestrians, with a notable skew towards the views of disabled people. There is little published information on the views of drivers or cyclists and such evidence as is available tends to be continental.
- 3.4.2 A strong theme in the literature is the concerns of disabled people, with an emphasis on blind or partially sighted people in particular. These concerns are particularly acute with regard to level surface schemes as a result of some people's habitual reliance on kerbs.
- 3.4.3 The main concerns reported among visually impaired people are:
- Risk from vehicles because of the difficulty in identifying different parts of the street
 - Difficulty in navigating through the space in the absence of a line to follow or clear landmarks
 - Lack of confidence in appropriate driver behaviour.
 - Lack of a clearly defined comfort space free from vehicles in which to rest, re-orientate etc.
- 3.4.4 Focus group research carried out by the Guide Dogs for the Blind Association (Guide Dogs, hereafter) suggests that these concerns may be shared by people with reduced hearing, people with reduced mobility and people with learning difficulties although the specific nature of the concerns varies from group to group, for example some mobility impaired people are quoted as being concerned about their ability to evade vehicles¹⁰. Conversely it is also the case that for those mobility impaired people dependent on vehicular access, Shared Space, while maybe not ideal, is preferable to pedestrianisation¹¹.
- 3.4.5 The concerns of disabled people in Home Zones in residential low-traffic environments were researched on behalf of the Disabled Peoples Transport Advisory Committee (DPTAC)¹². This study specifically included comparison of Home Zones (with and without a level surface) with 'traditional' residential streets. 73 disabled people took part in the study and 11 Home Zone sites were reviewed. The study showed that disabled peoples' responses to Home Zones are extremely mixed - see Figures 3.1 and 3.2 below.

¹⁰ The Guide Dogs for the Blind Association, Shared Surface Street Design Research Project The Issues: Report of Focus Groups, 2006

¹¹ Mobilise, contribution to project Sounding Board, 2009

¹² JMU Access Partnership, Designing for Disabled People in Home Zones, DPTAC, 2007

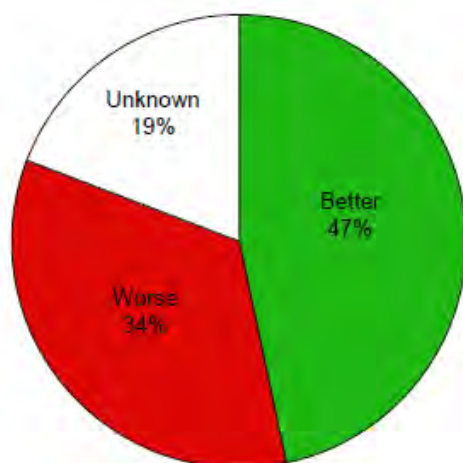


Figure 3.1 Disabled people's responses to: "Do you feel this Home Zone environment is better or worse than a traditional residential street environment in terms of overall navigation?"

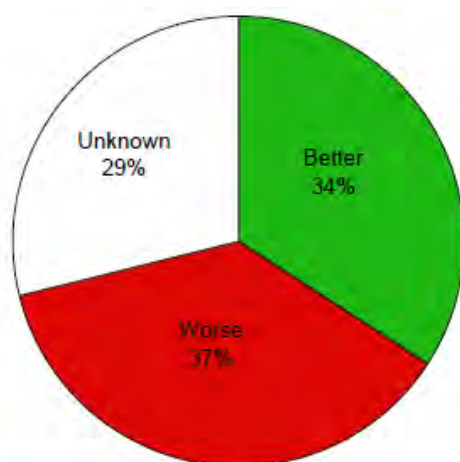


Figure 3.2 Disabled people's responses to: "Do you feel this Home Zone environment is better or worse than a traditional residential street environment in terms of overall safety?"

- 3.4.6 This pattern of responses shows a highly diverse reaction among disabled people to non-standard highway designs, and by implication to standard highway designs. This heterogeneity was not just found between people with different sorts of disability, for example the authors note that "Both negative and positive comments were made by participants in relation to their Guide Dog's ability to cope with the Home Zone. Some owners felt that their Guide Dog would adapt and improvise whilst others felt that there was a lack of cues for the dogs to focus on."
- 3.4.7 The nature of people's responses in the DPTAC study varied according to the specific designs of the Home Zones, which had a variety of features. Three of the eleven sites were found to be "easy" or "very easy" to navigate by 100% of participants. These were Magor Village, Monmouthshire; Morice Town, Plymouth and Duke of Edinburgh Way, Worcestershire. These Home Zones all feature a level surface but with the use of physical features and surface differences to differentiate parts of the surface and to restrict the access of vehicles to some

parts of the space. The Worcestershire site had the greatest proportion of people finding the Home Zone “very easy” to navigate. This site featured a level surface with bollards to channel vehicle movement. Tactile paving was provided at key crossing points. The Home Zone with the highest proportion of people finding navigation either “difficult” or “very difficult” was Albany Street, in Kingston Upon Hull, described as “making use of a kerb (which restricts free movement). A kerb line with 2m clear distance from the back of the footway to the kerb was utilised...Conservation kerbs with a 450mm splay and 50mm upstand were used”. Conversely the scheme with the highest proportion of respondents finding navigation “very difficult” was Darcy Gardens in the London Borough of Barking and Dagenham. This scheme is not a Home Zone but is a level surface cul de sac with no differentiation of the space and with parked cars providing obstacles. Opinion at this scheme was polarised, with approximately equal proportions of people finding navigation “very easy” and “very difficult”. This polarisation was not found at the Albany Street Home Zone, where no users found navigation better than “difficult”.

- 3.4.8 Based on this limited sample the user responses suggest that a level surface with differentiated spaces and appropriate tactile information may be a more optimal solution for navigation by disabled people with a range of disabilities than either a kerbed or an entirely undifferentiated surface. Nevertheless it must be emphasised that the range of user responses reinforces the analysis that Shared Space schemes are highly particular to their setting and in their design. Both general approaches and specific features can have different effects depending on how they are deployed. It also underlines the diversity of users’ views and needs and the risk of treating some groups as though their requirements are homogenous.
- 3.4.9 Perceptions of safety also varied between schemes. Again the Duke of Edinburgh Way scheme was rated highly as was the Home Zone at Maryatt Avenue, in the London Borough of Harrow which featured a 15mm chamfered kerb with a colour contrast. Again the Darcy Gardens level surface cul de sac led to mixed opinion with approximately two thirds of respondents believing it “unsafe” or “very unsafe” and around a third finding it “safe”.
- 3.4.10 DPTAC’s study found that although disabled people found much to criticise in the design of Home Zones, many of the issues identified were soluble through careful design. Design recommendations included the provision of clearly defined pedestrian areas and routes; clear identification of safe crossing points; achieving low vehicle speeds; clear gateways; careful placement of street furniture; smooth surfaces and good lighting.
- 3.4.11 There are also concerns expressed in the literature and in our survey about the ability of younger children to understand how to behave without clear rules for using a redesigned street as opposed to the simple instruction to ‘stop at the kerb’. It is notable that these concerns are generally expressed by adults on behalf of children.
- 3.4.12 One study however directly reports children’s views on safety and the road environment. This study was qualitative and based on observation of children’s behaviour and group interviews involving 122 children in North London and Hertfordshire¹³. The study was based on typical highway layouts and did not specifically address Shared Space environments but does identify some relevant issues. Firstly it identified that children frequently believed that

¹³ Lupton, K and Bayley, M, Children’s Views on the Road Environment and Safety, Proceedings of the Institute of Civil Engineers – Transport, vol. 159, no.1, pp9-14.

they were at risk because of their own distraction, particularly when travelling with other children. This may indicate that some children may have difficulty maintaining the necessary awareness of other street users in Shared Space (although in Shared Space environments drivers may be expected to be particularly aware of the unpredictability of children and compensate for this), conversely it may suggest that layouts that provide the illusion of safety may be associated with lower levels of concentration by all users. Secondly the research reveals that younger children in the sample (aged 8-9) were “more conscious of the rules for crossing the road....by age 10 children had become less rule-conscious and were beginning to base their crossing decisions more on the prevailing traffic conditions.” This may indicate that younger children could be less comfortable in Shared Space environments in which there is a deliberate ambiguity about the rules. If the hypothesis about the negotiated nature of behaviour in Shared Space is true this may disadvantage younger children: “children are inexperienced at negotiation with adult drivers and often find their intentions difficult to predict.”

- 3.4.13 York¹⁴ reports an interview survey of a total of just over 100 pedestrians at two sites described as pedestrian priority areas into which buses are permitted. One, East Ham, featured a level surface, the other, Hounslow, low kerb delineation. Interestingly a slightly higher proportion of respondents in Hounslow (84% v. 75%) agreed that crossing the road was easy while a greater proportion of respondents in East Ham than Hounslow (59% v. 49%) agreed that ‘You treat the centre as a road’. Notably flows of vehicles were substantially higher in East Ham - 75-98 average hourly traffic flow v. 28-31 average hourly traffic flow. In both locations some respondents expressed a desire for reductions in vehicle flow. Despite the level surface, consultation with disability groups at the East Ham scheme identified few fundamental issues although a number of detailed design suggestions were made. Traders in Hounslow were positive about the scheme.
- 3.4.14 MVA interviewed 55 members of the public in Shared Space schemes during the appraisal stage of this study. This was a random sample of people actually using Shared Spaces and was designed to provide a snapshot of views in a variety of settings because much of the attitudinal research in the literature is based on discussion ‘in principle’ of shared space with people not actually in or using the spaces. The users interviewed were a mixture of visitors and residents

Characteristic	Rounded %	Number
Average Age		42
Local Residents	58%	32
Visitors	23%	13
Workers	18%	10

Table 3.1 Characteristics of 55 Respondents

- 3.4.15 The exercise was not intended to specifically canvass the views of disabled people although the random sample included 8 people who stated that they had some form of disability (at

¹⁴ York, op cit.

14.5% broadly matching the proportion in the national population), as summarised in Table 3.2

		Number
Disabled Users	14.5% of total	8
Walking Stick		5
Wheelchair		2
Visually impaired		1

Table 3.2 Disabled People Interviewed

- 3.4.16 As most in this group were mobility impaired, we draw no conclusion about the views of visually impaired people, people with hearing impairment or people with learning difficulties.
- 3.4.17 Across the sample of 55, participants tended to be in favour of the schemes or broadly neutral, including frail older people and people with mobility impairment. Nevertheless, some concerns were raised about particular aspects. The interviews revealed a desire for less ambiguity about the uses of the scheme, with several respondents suggesting full pedestrianisation would be preferable.
- 3.4.18 Disabled people, older people, and people with buggies were positive about level surfaces and the freedom of movement they afforded. Some concerns were expressed about possible risks to children arising from a lack of awareness of vehicles although, when prompted, no respondents had experience of any such incident.
- 3.4.19 An unexpected finding of our qualitative research was the number of respondents who referred to improved personal security in the area following the implementation of Shared Space. Reasons cited included the resulting increase in footfall and the reduction in clutter which made the space more visible.
- 3.4.20 Drivers questioned in our study were also favourable towards Shared Space and level surface in particular. Two particular benefits expressed were that:
- the more open space allows drivers to negotiate their way around groups of pedestrians more readily, and
 - the lack of defined footways mean that delivery drivers can park closer to buildings without obstructing pedestrian flows.
- 3.4.21 Drivers reported that their choice of path through the space was broadly the same as it had been prior to the introduction of the scheme, but they passed through it more slowly.
- 3.4.22 A number of authorities conducted public attitude surveys after implementing Shared Space schemes. They found that respondents were generally supportive, although there was some

criticism on detailed design issues. For example, in Shrewsbury cyclists reported concerns about the granite sett surface being uncomfortable and slippery¹⁵.

- 3.4.23 A number of these studies indicate the importance of good design in Shared Space schemes to meet the individual needs of users.

3.5 Visual amenity

- 3.5.1 Visual amenity is not directly quantifiable but evidence suggests that people appreciate the visual improvement resulting from some placemaking schemes. For example, 73% of respondents agreed that visual amenity had improved as a result of Home Zone schemes¹⁶. This is to be expected as visual improvement is often an explicit objective.
- 3.5.2 The qualitative research conducted during this Appraisal stage found that many pedestrian respondents raised the issue of improved visual amenity without prompting. They referred to, for example, the “feel and look of new surface materials”, “lights in the seating” [where a lighting scheme was part of the design], “wider, open space”, “pleasant atmosphere” etc.
- 3.5.3 In continental schemes the evaluation of the Laweiplein in the Netherlands found that after implementation of the scheme c.81% of respondents rated the visual amenity as good or very good compared to 20% in the before period¹⁷.
- 3.5.4 At the Skvallertorget scheme in Sweden a survey of users found very strong agreement with statements that Skvallertorget “is beautiful”, “has improved” and “is a living square”¹⁸.
- 3.5.5 These findings are echoed by van Gorp’s review of five Shared Space schemes in the Netherlands which noted that “in all of the projects the new planning approach has produced an attractive environment”¹⁹.

3.6 Use of facilities

- 3.6.1 A theoretical indicator of success would be the extent to which facilities such as seating, or cycle parking are used. We found no evidence in the existing literature of data on such usage although as noted in 3.10 below the introduction of seating in Castle Street, Kingston Upon Thames was noted to change the nature of pedestrian activity in the street.

3.7 Proportion of pedestrians moving freely

- 3.7.1 A fundamental objective of many Shared Space schemes is to enable the freer movement of pedestrians. There is little published literature directly on this topic. Pedestrian movement

¹⁵ Wheeler, op cit.

¹⁶ Webster D, Tilly A, Wheeler A, Nicholls D, Buttress, S Pilot Home Zone schemes: summary of the schemes, TRL 654, Crowthorne 2005

¹⁷ Noordelijke Hogeschool Leeuwarden, The Laweiplein, Evaluation of the Reconstruction into a Square with Roundabout, 2007

¹⁸ Palmblad, A and Sari, W, Shared Space in Sweden, presentation, 2009

¹⁹ Van Gorp, Marc, ‘De veiligheid van mooi’ Onderzoek naar de verkeersveiligheid en functionaliteit van nieuwe ontwerpen van de openbare ruimte., Goudappel Coffeng, unpublished project report, 2007.

patterns in conventional street layouts are generally governed by the infrastructure, specifically pedestrian barriers and kerbs. These features can present physical and, to some extent, psychological barriers to pedestrians.

3.7.2 The reduction in such physical barriers is anecdotally reported to have resulted in freer pedestrian movement at some of our case study sites. For example, in the level surface scheme at Station Road, Tidworth, pedestrians were reported as crossing on their desire lines. This physical freedom of movement was also noted by respondents to our own qualitative research, including mobility impaired pedestrians who liked the absence of kerbs.

3.7.3 There is some evidence that pedestrian freedom of movement is restricted by traffic flow and speed. York²⁰ identifies a series of thresholds with combinations of vehicle flow and speed above which pedestrians tended to walk along what would have been the footway area rather than walking along the central street space:

- traffic (other than bus) flow exceeds 50 vehicles per hour with speeds not exceeding 30mph
- traffic (other than bus) flow exceeds 100 vehicles per hour with speeds not exceeding 25mph, or
- traffic (other than bus) flow exceeds 200 vehicles per hour with speeds not exceeding 20mph.

3.7.4 Where such conditions are achieved, there is evidence that pedestrians move differently within the space. York's evidence does not imply that Shared Space approaches cannot deliver benefits above these thresholds but that the fullest benefits are likely to be achieved where these conditions are met.

3.8 Delay to pedestrians crossing the space

3.8.1 Delay to pedestrians is a further theoretical indicator of their ease of movement. We have found no evidence in the literature, or from our case studies, of such data being collected in the UK.

3.8.2 At the Laweiplein scheme in the Netherlands it was noted that "both cyclists and pedestrians tend to be almost always granted priority at the junction. As a result these users are very rarely held up for any significant length of time."²¹ It was also noted at the Skvallertorget scheme in Sweden (described in more detail below) that a high proportion of cars give way to pedestrians and cyclists²², presumably decreasing delay.

3.9 Pedestrian flow counts

3.9.1 There is little published evidence on changes in footfall in Shared Space schemes. There is some suggestion that Home Zone schemes were not, of themselves, generating increased

²⁰ York, Op cit.

²¹ Noordelijke Hogeschool Leeuwarden, The Laweiplein, Evaluation of the Reconstruction into a Square with Roundabout, 2007

²² Palmblad, A and Sari, W, Shared Space in Sweden, presentation, 2009

pedestrian or cycle activity²³. Conversely a number of the Mixed Priority Route projects noted significant increases in footfall, of up to 60%²⁴. Similarly monitoring for TfL of the Castle Street, Kingston Upon Thames, scheme identified a 12% increase in pedestrian footfall from 2005-2006 following the implementation of a scheme that introduced a level surface street with access for pedestrians, cyclists and delivery vehicles²⁵.

- 3.9.2 In a number of our case studies local authorities cited evidence of increases in pedestrian flow, but as they mainly comprised regeneration schemes, the cause was often attributed to changes in land-use.
- 3.9.3 Some authorities have collected limited footfall data. According to Brighton and Hove Council, New Road has seen an increase in footfall of 162% following implementation of this Shared Space scheme.
- 3.9.4 Exeter High Street's Shared Space scheme is some thirty years old, hence no meaningful historical analysis can be conducted. Nevertheless, it is an extremely popular destination attracting approximately 100,000 pedestrian trips per day, suggesting that Shared Space can sustain high levels of footfall although clearly other factors such as retail offering will influence such figures.

3.10 Nature of Pedestrian Activity

- 3.10.1 As well as changes in the number of pedestrians, it is also appropriate to consider the nature of their activity, in particular whether they are treating the redesigned highway as a place as opposed to a movement corridor. Despite the lack of actual count data, there was anecdotal evidence from our qualitative research that some users respond to Shared Space schemes by treating them as destinations. This was particularly notable in schemes such as New Road, Brighton, where active frontages and seating provide opportunities and reasons to spend time in the space. The TfL monitoring of the Castle Street scheme²⁶ also identified an increase in pedestrians sitting in the street eating and reading as well as an increase in pedestrians observed browsing in shop windows.
- 3.10.2 The attractiveness of a street as a destination is not solely a function of its highway design. Features within the space are necessary for people to want to use the street, however the evidence available suggests that the redesign of spaces associated with Shared Space scheme can facilitate and encourage people to make use of the opportunities that exist within a given street. This analysis was supported by qualitative research carried out by MVA Consultancy for Design for London²⁷ into the economic benefits of public realm: retailers and businesses noted that environmental improvements encouraged footfall with a consequent economic benefit.

²³ Webster et al, op cit.

²⁴ DfT, Mixed Priority Routes Road Safety Demonstration Project Summary Scheme Report, London 2008

²⁵ CBP, BSP 05/06 Walking Outcome Monitoring, TfL, 2007

²⁶ CBP, BSP 05/06 Walking Outcome Monitoring, TfL, 2007

²⁷ Reid, S and Shore, F, Valuing Urban Realm, Unpublished Project Report, 2008

3.11 Space available to pedestrians

- 3.11.1 Pedestrians will not necessarily use all of the street available to them in principle. Their use of space depends on their willingness to occupy it, and the impact of vehicular traffic has a major bearing on this.
- 3.11.2 Many Shared Space schemes in the literature survey and our case studies increase the physical space available to pedestrians. Kerbed schemes that widen the footway clearly increase space for pedestrians, but this is limited by the need to maintain carriageway width. Evidence from the case studies indicates that additional space is welcomed by pedestrians. The public survey of attitudes in Shrewsbury High Street found that two thirds of respondents found the widened and de-cluttered footways easier to use²⁸. Similarly monitoring for Transport for London of environmental improvements in Long Acre that included de-cluttering of footways and a wider pedestrian crossing found improved public perceptions of crowding and ease of movement in 2007 and 2008 against a 2005 baseline despite increases in footfall over the period²⁹.
- 3.11.3 The willingness of pedestrians to use a Shared Space as intended depends on a combination of vehicular speed and flow and possibly on the relative flow of pedestrians to vehicles. The more favourable the conditions, the greater the tendency for pedestrians to occupy the space theoretically available to them. As noted above, York³⁰ found that in pedestrian priority areas the percentage of pedestrians walking along the road reduced as vehicle flow increased. This study also found that the most influential factor on pedestrians' willingness to walk in the road was the speed of motor vehicles. Each 1mph increase in the 85th percentile speed corresponded with a reduction (of about 3.5%) in the proportion of pedestrians walking in the road.
- 3.11.4 Many Shared Space schemes aim to increase the space available to pedestrians. Where this is done by increasing footway width it is generally successful and welcomed, although limited by considerations of vehicle manoeuvring. Level surface schemes aim to overcome manoeuvring issues and make the entirety of a street's width available to pedestrians without having to reserve carriageway space for vehicles. The extent to which this is successful varies with the flow, and most particularly speed, of motorised traffic.

3.12 Propensity for drivers to give way to pedestrians

- 3.12.1 It is claimed that an objective of Shared Space is to achieve a situation where drivers and pedestrians determine priority between one another by other (social) rules³¹. An appropriate performance indicator here would be how often drivers give way to pedestrians.
- 3.12.2 Such an indicator is quantifiable in theory but it does not appear to be a common consideration in scheme assessments in the UK. Examples of schemes where it has been considered include Shenley Road in Borehamwood and Shrewsbury High Street. Both schemes included 'courtesy crossings' for pedestrians which were monitored. At each site, there was a marked tendency for drivers to give way to pedestrians at the courtesy

²⁸ Wheeler, op cit.

²⁹ CBP, LIP walking outcome monitoring - 07/08 after surveys, TfL, 2009

³⁰ York, op cit.

³¹ Shared Space, Final Evaluation and Results, Interreg 2008

crossings. Quemby and Castle³² cite observation studies indicating that most drivers gave way to pedestrians at the courtesy crossings in Shenley Road. Observations at Shrewsbury High Street showed that drivers tend to give way to pedestrians at the courtesy crossings but pedestrians do not always choose to assert priority over vehicles.

- 3.12.3 A study of the Skvallertorget Shared Space square in Norrköping, Sweden, did consider the question of interaction. Skvallertorget is a level surface square in the town centre. It features a textured level surface accessible to pedestrians and vehicles with a smooth surfaced perimeter area for pedestrians with a tactile boundary and some use of street furniture to prevent vehicle ingress. The square is both a civic centre to the town and a four way junction with approximately 14,000 vehicles per day moving through it. Video surveys were used to identify the interactions of different types of road user and to estimate the speed of vehicles in specific encounters. The study indicated that in 90% of encounters between cars and pedestrians and 61% of encounters with cyclists the driver stopped or adjusted their behaviour³³. The study found that the incidence of pedestrians and cyclists giving way to motorised vehicles increased with vehicle speed. This tends to reinforce the argument that the sharing of space is a matter of drivers ameliorating their behaviour, rather than a joint decision by two road users. It also tends to support the argument that low vehicle speed is a necessary precondition for drivers to have time to decide to concede priority.

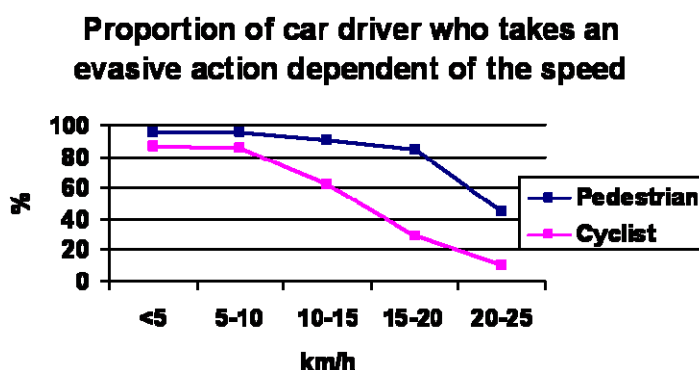


Figure 3.3, Taken from Palmblad, A and Sari, W, Shared Space in Sweden, presentation, 2009

- 3.12.4 The influence of driver speed on the outcome of their encounters with vulnerable road users was also observed in site visits. Where vehicles approach a shared area relatively rapidly, pedestrians (if they are aware of the vehicle) tend to give way. Where vehicles approached slowly, observation suggested drivers were more likely to give way to pedestrians. This emphasises the importance of achieving low vehicle speeds via the design of Shared Space schemes.

³² Quemby, A, Castle, C, A Review of Simplified Streetscape Schemes, 2005

³³ Palmblad, A and Sari, W, Shared Space in Sweden, presentation, 2009

3.13 Reduction in traffic flow

- 3.13.1 A reduction in vehicular traffic is often sought by designers of Shared Space schemes as they attempt to balance the needs of various user groups. This is sometimes achieved via regulation. For example the Exeter High Street scheme was supported by an order restricting access to public transport vehicles.
- 3.13.2 There is some evidence that Shared Space schemes can bring about a reduction in flow even when access is not restricted. This may be due to wider network changes or possibly as a result of drivers expecting delay in passing through the space. For example the Shrewsbury scheme led to a 34% reduction in motor traffic.
- 3.13.3 Conversely, where a Shared Space scheme forms part of an important link, it can remain heavily used, even if orders restricting use are in place – both Sandwell MBC and Manchester City Council report concerns about drivers failing to obey prohibitions at some of their schemes.

3.14 Reduction in traffic speed

- 3.14.1 Reduced speed is not necessarily a primary objective of Shared Space schemes, but it is often considered a prerequisite for placemaking to be achieved - York's work³⁴ suggests 20mph as a preferred upper threshold. There is mixed evidence that the speed of through-vehicles is reduced in such schemes. Webster et al report an average reduction in both mean and 85th percentile speed of approximately a quarter in seven pilot Home Zones³⁵ and that the effect was particularly marked in parts of the Home Zones with a level surface - those locations were most likely to have an 85th percentile speed of between 15mph and 20mph.
- 3.14.2 In mixed use locations, the evidence from Historic Core Zone projects is less convincing. 85th percentile speed fell only marginally in the Bury St Edmunds scheme³⁶, with some suggestion that the fastest drivers were least influenced. At Crossley Street, Halifax, speed was reduced more significantly (by approximately 50% in one location), but actually rose in another³⁷. Speed was reduced more notably in the Shrewsbury High Street scheme, with the number of vehicles exceeding 20mph falling at one location from 50% to 7%³⁸. It should be noted that in all these instances traffic speeds were relatively low before the interventions and that the speed reductions were achieved entirely through environmental features with no level changes or traffic calming.
- 3.14.3 The literature on driver speed choice suggests that the types of changes introduced by Shared Space schemes are likely to affect vehicle speeds. For example Kennedy et al reviewed the evidence on psychological traffic calming³⁹. They reported that more complex environments tend to be associated with slower driving speeds. The presence of pedestrians, parking and other forms of 'side friction' were also found to encourage lower vehicle speeds.

³⁴ York, Op cit.

³⁵ Webster D, Tilly A, Wheeler A, Nicholls D, Buttress, S Pilot Home Zone schemes: summary of the schemes, TRL 654, Crowthorne 2005

³⁶ Wheeler A, Traffic Calming in Historic Core Zones: Bury St Edmunds, TRL 388, Crowthorne, 1999

³⁷ Wheeler, A Traffic Calming in Historic Core Zones: Crossley Street, Halifax, TRL 288, Crowthorne 1997

³⁸ Wheeler, A Traffic Calming in Historic Core Zones: High Street Route, Shrewsbury, TRL 374, Crowthorne 1999

³⁹ Kennedy, J., Gorell, R., Crinson, L., Wheeler, A. and Elliott, M, 'Psychological' Traffic Calming. TRL Report No. 641. Crowthorne, 2005

- 3.14.4 Kennedy et al also identify the effect of three-dimensional design, with vertical objects such as trees and buildings in drivers' peripheral vision likely to affect vehicle speed. Work carried out by Land Use Consultants et al⁴⁰ for the Scottish Executive found that indicators of human activity were most effective in encouraging drivers to slow down. This was consistent with the findings of our qualitative research where drivers reported travelling more slowly and acting more cautiously because of the unpredictable nature of pedestrians using the space. There is, however, less information on driver behaviour in such locations when pedestrian volumes are lower. We found little evidence of UK local authorities collecting such speed data in this appraisal stage.
- 3.14.5 Both Kennedy and the Land Use Consultants studies emphasised the importance of clear transitions to enable drivers to understand that they were entering a different type of space.
- 3.14.6 The evidence suggests that some speed reduction can be achieved by Shared Space schemes and that a level surface in a residential setting appears to be an effective strategy as part of a more comprehensive scheme. However, there is little published data to show whether speed reduction can be achieved by a level surface in other settings. Nor is it possible to determine, on the basis of the limited size of Home Zone schemes, over what distance the effect of a level surface on driver behaviour might persist.
- 3.14.7 There is an inconsistent approach to speed monitoring among authorities. Where data has been provided, it is positive and in some cases shows dramatic speed reductions. However, in some instances, local authority officers expressed concerns that while speed had reduced it had not done so to the extent hoped for. This was the case in both kerbed and unkerbed examples. In one case, with very substantial forward visibility for drivers, the local authority expressed a desire to retrofit vertical traffic calming at gateway features and within a level surface scheme. This indicates that site specific factors are highly likely to influence the speed of vehicles.
- 3.14.8 It is possible that where speed had not dropped by the amount anticipated this was as a result of flows of pedestrians being relatively low. However, given the lack of consistent pedestrian flow and vehicle speed data, this can only be stated tentatively. If the effect is real, the pattern would be consistent with Kennedy and Land Use Consultants' work that identified human presence (actual or anticipated) as an important factor in influencing driver speed and, by extension the importance of features that draw in pedestrians and encourage them to linger.

3.15 Casualty Risk

- 3.15.1 Shared Space schemes are not primarily intended to address road safety issues. The aim is generally to improve the quality of the local environment while, at the very least, not increasing the number or severity of collisions.
- 3.15.2 Risk can be complex to calculate and needs to be assessed in relation to user exposure if casualty numbers are to be reliably interpreted. As exposure data for pedestrians is extremely limited, and there is a lack of vehicle flow data for many schemes, it is necessary to consider recorded casualties in isolation. However these limitations mean that it is not generally possible to consider changes in risk across a variety of schemes. Nevertheless,

⁴⁰ Land Use Consultants, JMP and Terence Lee, Natural Traffic Calming, 1999

there are examples of schemes for which exposure data are available and these do tend to demonstrate a reduction in risk to vulnerable road users. For example monitoring of the Newlands Avenue Mixed Priority Route scheme in Hull identified an 18% increase in pedestrian activity at crossings and a 100% reduction in pedestrian casualties. Similarly the same scheme recorded a 48% increase in cycle use with a reduction in cycle casualties of 21% in the same period⁴¹ indicating that at this scheme the risk to vulnerable users had declined sharply, simultaneous with significant proportional increases in activity.

- 3.15.3 Data on casualty numbers are available from a range of schemes, including Historic Core Zones, Mixed Priority Routes, and a variety of schemes in the Netherlands, including both Shared Space and level surface schemes.
- 3.15.4 Table 3.3 reproduces casualty data compiled by Quemby and Castle⁴² for a sample of Dutch schemes. These data suggest that these schemes are not consistently reducing casualties by a significant amount but there is no evidence that casualty numbers are increasing following the Shared Space scheme. (Care needs to be exercised when interpreting the data in this table due to the differing before and after periods).

⁴¹ DfT, Local Transport Note 3/08, Mixed Priority Routes: Practitioners Guide, 2008.

⁴² Quemby and Castle, op cit.

Scheme	Area Coverage	Before Period	After Period	No. of Collisions Recorded	
				Before	After
Oosterwolde (de Brick / Rode Plein) [Netherlands]	A junction and an extended road shopping street	93-97	99-01	8 damage only	1 serious 8 damage only
Oosterwolde (Makkinga) [Netherlands]	Two junctions at the edge of a residential area	93-96	98-01	2 damage only	2 slight 3 damage only
Drachten (Kaden-Torenstraat) [Netherlands]	A central junction	93-98	00-01	4 slight 26 damage only	4 damage only
Drachten (Kaden-Dwassva) [Netherlands]	A junction	93-99	2001	3 slight 17 damage only	1 slight 6 damage only
Drachten (Torenstraat-Vogelzang) [Netherlands]	Lightly traffic residential	93-99	2001	3 slight 7 damage only	3 damage only
Opeinde [Netherlands]	A larger area than a typical junction scheme	93-97	99-01	1 fatal 7 slight 24 damage only	1 slight 5 damage only
Donkerbroek [Netherlands]	A junction	93-97	99-01	1 slight 11 damage only	9 damage only
Olderberkoop [Netherlands]	Whole village	93-98	00-01	3 slight 14 damage only	5 damage only
Wolvega [Netherlands]	A busy junction	93-96	98-01	1 slight 4 damage only	4 damage only

Table 3.3 Casualty Records of a Sample of Dutch Simplified Street Schemes
Sources: Quemby and Castle 2006,

- 3.15.5 Gerlach et al also provide data for three Shared Spaces (including some of those reported by Quemby and Castle, although it is not clear that the data collection areas are precisely comparable) including more years 'after' data.

Severity Year	Fatal	Seriously Injured	Slightly Injured	Damage Only	Total
Drachten - Laweiplein					
1997	0	1	3	6	10
1998	0	0	0	9	9
1999	0	1	3	9	13
2000	0	0	0	9	9
2001*	0	0	0	4	4
2002	0	0	2	8	10
2003	0	0	0	3	3
2004	0	0	0	1	1
2005	0	0	0	1	1
2006	0	0	0	2	2
Drachten – De Drift/Torenstraat/Kaden					
1994	0	0	0	1	1
1995	0	0	0	8	8
1996	0	0	0	2	2
1997	0	0	1	8	9
1998*	0	0	1	2	3
1999	0	0	1	3	4
2000	0	0	0	0	0
2001	0	0	0	4	4
2002	0	0	2	6	8
2003	0	0	1	3	4
2004	0	0	2	6	8
2005	0	0	1	4	5
2006	0	0	2	2	4
Haren - Rijksstraatweg					
1997	0	1	2	10	13
1998	0	0	4	12	16
1999	0	0	0	16	16
2000	0	0	1	8	9
2001	0	1	1	17	19
2002	0	0	0	7	7
2003*	0	0	0	11	11
2004	0	0	0	4	4
2005	0	0	0	6	6
2006	0	0	0	7	7

* Year of implementation

Table 3.4 Casualty Performance of Three Shared Space schemes in the Netherlands, reproduced from Gerlach et al (undated)

3.15.6 The apparent trend in reduction of the number and severity of casualties at the Laweiplein is particularly interesting given the evidence that motorised traffic has increased by approximately 30% and cycle traffic by 5% between 2000 and 2005⁴³. This exposure data suggesting that the risk per user has decreased, although Gerlach et al argue that the

⁴³ Noordelijke Hogeschool Leeuwarden, The Laweiplein, Evaluation of the Reconstruction into a Square with Roundabout, 2007

decrease may result from slower traffic speeds on the approach to the junction as a response to the change in junction type from signalised to roundabout.

- 3.15.7 The De Drift/Torenstraat/Kaden junction has seen a less evident decline in casualties and Gerlach et al note that most slight injuries involve cyclists. This concern is reiterated by the Dutch Cycling Union who criticise the application of Shared Space in the Netherlands to high flow junctions, arguing that evidence suggests that Shared Space junctions with high vehicle flows consistently perform less safely for cyclists⁴⁴.
- 3.15.8 Data from the English Historic Core Zones studies (see table 3.5) suggests a lack of significant change in casualty numbers.

Scheme	Installed	No. of collisions recorded	
		5 Years before	5 Years after
Shrewsbury	1997	13 (9 pedestrian)	14 (9 pedestrian)
Halifax	1996	7 (1 pedestrian)	8 (5 pedestrian – 1 Fatal, 1 Serious)
Bury St. Edmunds Hatter St.	1996	4	3 (1 pedestrian)
Bury St. Edmunds Crown St.	1997	4	2 (1 pedestrian, 1 cyclist – serious)

Table 3.5 Casualty Performance of Historic Core Zone Schemes in England Source: Wheeler

- 3.15.9 Data from the Mixed Priority Routes schemes was gathered by local highway authorities participating in the DfT's Demonstration Project (see table 3.6). At these locations Shared Space principles were applied to arterial routes here traffic flows are higher and the delineation of vehicle routes is greater (although some schemes, such as Hull and Walworth Road, London, incorporate areas of level surface). Evidence indicates a more substantial reduction in casualties, with up to 60% reduction in some locations even though pedestrian footfall increased.

⁴⁴ Zeegers, T, Shared Concerns on Shared Space, Velocity Paper, 2009.

	Casualty Reduction (%)	Other Benefits
Crewe	21	2-3 mph reduction in average speed
Hull	24 (21 in cycle casualties)	48% increase in cycle flows 16% reduction in NO ₂ levels
Manchester	30	Number of cyclists more than doubled during the peak hours Bus passenger numbers up 9% on both weekdays and weekends
Norwich	60 (despite the increased night time activity)	5-7 mph traffic speed reduction
Oxford	36 (Almost 50% reduction in KSIs)	30% increase in the number of cyclists on the Cowley Road 10% reduction in the number of cars using the route
Liverpool	57 (slight casualties) 65 (Pedestrian casualties)	Significant increase in formal crossing movements Number of informal crossings has either increased or remained static where formal provision available
Leamington Spa	-	14% reduction in average speed
St. Albans	50 (in first 12 months of opening)	-
Southwark	42.5 (in first 6 months of opening)	-
Wandsworth	-	16% reduction in average traffic speed

Table 3.6 Summary of Early Monitoring Results from the Ten Mixed Priority Routes
Source DfT, 2008, Mixed Priority Routes Road Safety Demonstration Project – Summary Scheme Report

- 3.15.10 The data presented in the studies above is in the form of before and after analysis. This longitudinal approach is a way of controlling for the influence of differences between sites that may influence observations by comparing a site with itself in order to try to isolate the effects of the change in design. However, without comparison to control sites this approach cannot isolate the effects of the Shared Space design from other factors that may be influencing the trend in casualties at the study site. An alternative approach is a comparison between sites. This latitudinal approach controls for the effect of general trends but does not allow the influence of differences in the sites other than those of interest to the researcher to be isolated. Both methods offer benefits and have drawbacks. A latitudinal approach was used by van Gurp to compare the casualty performance of five Shared Space sites with five

matched traditional sites in the Netherlands⁴⁵. Van Gorp notes that the sample does not contain many examples of sites with different levels of traffic flow but argues that:

“One of the conclusions is that the new approach can be applied for traffic volumes of up to 6600 motor vehicles per 24 hours without causing a noticeable difference in the number of accidents. Objective statistics show that there is no difference in road safety between the new planning approach and a traditional road layout. The study has shown, however, that applying the new approach to volumes of 13,7000 vehicles per 24 hours will have an adverse effect on the number of accidents. There is a grey area for traffic volumes of between 6600 and 13,700 vehicles per day.”⁴⁶

- 3.15.11 Van Gorp also notes several of the Shared Space schemes may be considered successes against criteria of actual and perceived safety and functionality. He argues that:

“The three projects, all of which were based on the shared-space principle, show that this new approach can be applied to a variety of situations. In all of the projects, residents were consulted and their wishes were included in the design. Community involvement and the use of environmental elements have had a positive effect on people’s perceptions and their willingness to adjust their behaviour.”⁴⁷

- 3.15.12 Van Gorp’s conclusions reinforce the principle that Shared Space schemes are all particular and need to be considered in their social and environmental context. Interestingly his comments on the link between community involvement and subsequent behaviour emphasises the importance of process as well as physical features in the development of such schemes.

- 3.15.13 Based on the limited casualty data available there is no evidence that Shared Space schemes result in more casualties than traditional layouts at the types of flow at which they have been implemented in the UK. Van Gorp’s work indicates that at high traffic flows there may be an adverse safety impact although it is not clear whether this finding applies primarily to links, or junction, or both. Neither is there evidence that particular groups, including disabled people, are injured more frequently, although there is some suggestion that high flow Shared Space junctions may be more risky for cyclists. Conversely there is little conclusive evidence that Shared Space schemes consistently achieve significant casualty reduction. The lack of consistent exposure data means that the effect on casualties of changes in the numbers of different road users cannot be readily assessed. Nevertheless at the few UK schemes where exposure data are available there does appear to be a positive effect in reducing the number of casualties and the level of risk to pedestrians and cyclists.

- 3.15.14 York⁴⁸ assessed conflict between pedestrians and vehicles in six pedestrian priority areas in London. This analysis found that the number of conflicts increased with vehicle flow until vehicle flow exceeded a threshold above which pedestrians tended to avoid using the carriageway space. Conflicts were more likely to occur between pedestrians and private motor vehicles. At the two sites where vehicle flows were highest pedestrians tended to

⁴⁵ Van Gorp, Marc, ‘De veiligheid van mooi’Onderzoek naar de verkeersveiligheid en functionaliteit van nieuwe ontwerpen van de openbare ruimte., Goudappel Coffeng, unpublished project report, 2007.

⁴⁶ Ibid, Translation of key findings by Goudappel Coffeng

⁴⁷ Ibid

⁴⁸ York Op cit.

avoid using the carriageway and consequently the number of conflicts was lower, however the number of recorded accidents was higher. This may indicate that low level conflict is more frequent when 'sharing' of space is achieved but that more traditional configurations may result in lower frequency but more severe conflict that is more likely to result in injury to a pedestrian.

- 3.15.15 In some schemes traffic flows are deliberately diverted from the Shared Space schemes and there is some evidence that drivers voluntarily divert. We are aware of no evidence however regarding the alternative routes selected by drivers nor of any evidence of increased risk to vulnerable users on those alternative routes.

3.16 User comfort

- 3.16.1 User comfort is heavily dependent on feeling safe. Although from the data so far, Shared Space schemes where vehicle flows are under 6,800 vehicles per 24 hours appear to be at least as safe as conventional streets, some people can find them intimidating. The Guide Dogs⁴⁹ report on focus groups with disabled people concluded that the ambiguity inherent in level surface schemes can be a source of anxiety for blind or partially sighted people and that some concerns were stated by participants with a range of disabilities. Groups representing visually impaired people consistently oppose the implementation of level surface schemes that are shared with vehicles. Conversely our qualitative research found that a range of mobility impaired people appreciated level surfaces that enabled freer movement
- 3.16.2 These responses are not incompatible. Within each broad category of disability such as 'blind or partially sighted', 'mobility impaired' etc, there is a large range of conditions. In addition, individuals vary widely in their tolerance of perceived risk, uncertainty etc.
- 3.16.3 The research commissioned by DPTAC is one of the few published reports to benchmark disabled people's experience in Shared Spaces against the barriers they face in other settings. It suggests that a high proportion of disabled people find Home Zone schemes more satisfactory than conventional streets in terms of navigation, a small majority find them less satisfactory in terms of safety although as noted above the views of users were very mixed and were related to the detailed design of the schemes.
- 3.16.4 The anxiety identified by Guide Dogs was described as debilitating and, at times, people stated that they would avoid level surface streets. There are two, linked, components to peoples' anxiety that appear most acute: orientation/navigation and not knowing where vehicles may be. This disorientation is partly a consequence of the deliberate reduction in physical demarcation of the space in order that the street can be used by pedestrians more flexibly.
- 3.16.5 Visually impaired people require physical and/or tonal cues to orientate themselves and may prefer to use the open space of a level surface street in a more structured way i.e. moving along and across the space in a ladder-grid pattern equivalent to the footways and crossings in a conventional street. Some form of physical guidance that allows them to follow such a pattern combined with the ability to find a 'comfort zone' free from vehicles, or notification that they are entering a 'crossing', may be necessary.

⁴⁹ Guide Dogs, op cit.

- 3.16.6 At the Laweiplein scheme in the Netherlands, Noordelijke Hogeschool Leeuwarden report that despite the apparent reduction in actual risk the public perception of safety declined following the implementation of the scheme, with 45% stating that safety was 'poor' or 'bad' in 2005 compared to 30% in 2000⁵⁰. This perception was particularly notable among older respondents. It is noted that this perception of risk may be the mechanism by which objective safety is improved, i.e. a perception of risk may promote more cautious behaviour. Interestingly, by mode, perceptions of safety had declined among cyclists and drivers but had remained unchanged among pedestrians.
- 3.16.7 With regard to personal safety Noordelijke Hogeschool Leeuwarden note that at the Laweiplein, perceptions have improved with 81% now considering this reasonable, compared with 71% in 2000. This increase was most notable among pedestrians, cyclists and older people. This may be linked to the significant improvement in public perception of the quality of the Laweiplein as a space.
- 3.16.8 Interestingly at the Laweiplein scheme public perception of traffic flow has substantially improved, with the proportion of people considering congestion to be bad falling from 60% before the scheme in 2000 to 5% by 2005. This subjective assessment was supported by data and observation which found that all modes appeared to cross the junction with less delay and that the average delay to vehicles had fallen from 50 to 30 seconds despite a 30% increase in motorised vehicle flow.
- 3.16.9 At the Skvallertorget scheme 90 pedestrians, 18 cyclists and 31 car drivers were also surveyed. The majority of pedestrians, cyclists and drivers agreed that they felt safe, although interestingly this was marginally less common among drivers⁵¹. They also tended to agree that they felt safer than before, although this was more marginal. There was less agreement that the traffic rules were easy to understand and were followed by other users. Notably cyclists and pedestrians both agreed that other road users tend to take evasive action with pedestrians agreeing most strongly. Conversely drivers tended to disagree with this statement. These perceptions directly match the observed behaviour in the Square.

⁵⁰ Noordelijke Hogeschool Leeuwarden, The Laweiplein, Evaluation of the Reconstruction into a Square with Roundabout, 2007

⁵¹ Palmblad, A and Sari, W, Shared Space in Sweden, presentation, 2009

4 Knowledge Gaps

4.1 Introduction

- 4.1.1 There are significant gaps in the data available on the assessment of Shared Space schemes. In particular, there is a lack of information available on pedestrian footfall, changes in pedestrian and vehicle flow over time, and the use of features such as seating.
- 4.1.2 There are also knowledge gaps concerning some of the underlying principles of Shared Space. These are discussed below.

4.2 When Do Drivers Give Way?

- 4.2.1 There is evidence that drivers tend to give way to pedestrians more readily in Shared Space schemes. There is also limited evidence from the qualitative research undertaken thus far that drivers report travelling more slowly and being more prepared to stop for pedestrians. This is important because it has a bearing on the ultimate purpose of Shared Space.
- 4.2.2 Drivers appear inclined to give way in low speed situations where vehicle flows are low relative to pedestrian numbers. However the specific speeds and flows below which drivers are likely to concede priority have not been established and it is not clear how voluntary speed control varies as pedestrian flows and other environmental factors vary.
- 4.2.3 Some of the schemes examined in this Appraisal stage suggest that courtesy crossings may provide trigger points that encourage drivers to give way, particularly when they are reinforced by vertical deflection. This can however seem to be at odds with some of the objectives of Shared Space, where the aim is often to enable the free movement of pedestrians throughout the street. It is not clear how features which provide an opportunity for less confident pedestrians to negotiate the space affect the willingness of drivers to give way to them in other parts of a scheme.
- 4.2.4 A further uncertainty is whether and how driver behaviour varies across different population segments. Some of the evidence implies that the fastest drivers may be least affected. Younger male drivers may be less likely to slow down in the presence of pedestrians. This latter point may be directly relevant to the comfort of some people who require a high level of certainty that drivers will behave appropriately in the absence of features such as signalised crossings and kerbs.

4.3 How Does Sharing Work?

- 4.3.1 The mechanism by which sharing of space by pedestrians and vehicles actually takes place needs further investigation. York's⁵² work suggests that pedestrians will attempt to share when certain favourable conditions exist and this is reinforced by comments on the Shrewsbury scheme.
- 4.3.2 It is often suggested that in Shared Space, interaction between drivers and pedestrians relies on eye contact. While this may be how some users negotiate their way through the space, it

⁵² York, Op cit.

is not clear that this is how the majority of users are actually behaving. There is no certainty that drivers and pedestrians are always going to be able to establish eye contact with one another and logic suggests that driver will not therefore rely on it. Our working hypothesis is that even where pedestrians are prepared to attempt to share, the decision whether sharing takes place seems to rest primarily with the driver. Drivers appear to base their intended actions primarily on actual pedestrian behaviour, rather than relying on direct communication.

- 4.3.3 There is no convincing data that eye contact is used predominantly as a means of communication between drivers and pedestrians. In a number of the schemes reviewed, the prevailing flow of vehicles and pedestrians is in the same direction making eye contact unlikely.
- 4.3.4 Drivers often need to respond to particular situations without any deliberate communication on the part of pedestrians. Research into psychological traffic calming indicates that drivers respond to complex situations by behaving more cautiously. Cognitive load and drivers' assessment of risk possibly underlie their decisions. This interpretation is supported to some extent by respondents interviewed during the qualitative research who stated that they tended to drive slowly because of the density of pedestrians and their belief that pedestrians may behave unpredictably, and may not even realise there are vehicles present.
- 4.3.5 It is not clear how initial patterns of behaviour based on cognitive load and risk assessment change as motorists become familiar with schemes. It has been suggested that novelty can encourage drivers to slow down (see for example Enwright's⁵³ advocacy of 'intrigue and uncertainty' in the application of speed reduction devices). Assuming the cognitive load/risk assessment model is correct, then to find out whether novelty is part of its effect, and whether it changes over time requires further evidence.
- 4.3.6 These two hypotheses to explain sharing (communication v. driver risk assessment) need not be mutually exclusive. It is possible to envisage situations where the volume of pedestrians and the sense of place encourages drivers to slow to an extent where communication becomes more likely and is used to resolve situations where neither user has chosen to take priority.

4.4 What Happens to Pedestrian Behaviour?

- 4.4.1 Although a high-level objective of many Shared Space schemes is to facilitate pedestrian movement, there is little data on how pedestrians actually move within Shared Spaces. Some authorities promoting schemes have said they intend to carry out such monitoring but it is not always seen as a high priority, particularly where a scheme appears to be working well.
- 4.4.2 Several key pedestrian behaviours and attitudes need to be better understood to enable robust guidance to be prepared. Key questions are:
 - How do pedestrians move within Shared Space? How might their behaviour be related to factors such as traffic flow, traffic speed, pedestrian type and pedestrian footfall?

⁵³ Enwright, D Street Reclaiming, 1999

- How do pedestrians evaluate risk when interacting with vehicles? Does this evaluation translate into awareness or does it give rise to anxiety and a disincentive to use the street? How does such interpretation vary across different population segments and how does it compare with more typical street layouts?
- Under what conditions are pedestrians willing to cross the space in the expectation that drivers and cyclists will give way?

4.4.3 A further uncertainty is whether, and how, pedestrian reactions to Shared Space may vary between segments. It is probable that different people will exhibit different attitudes to risk, willingness to mingle with motorised vehicles etc. This raises the possibility that sharing of space may need to be considered as a process whereby, when conditions are favourable, some pedestrians begin to actively use the space, increasing the complexity for drivers and hence tending to reduce vehicles' speed, consequently encouraging more risk averse pedestrians to use the space more fully too. Within such a model it is also possible that some individuals may be sufficiently risk averse that they will never voluntarily share space with motorised vehicles.

4.5 How Can Shared Space Be Made More Navigable?

- 4.5.1 A typical street with footways and discrete crossing points encourages pedestrians to adhere to a ladder-grid pattern when moving within the street. In a Shared Space, people tend to follow desire lines which are likely to bear little resemblance to such conventional patterns of movement. However, for visually impaired people, maintaining a ladder-grid is likely to be beneficial. This grid does not have to be explicitly expressed in the layout, but it needs to be detectable by visually impaired people.
- 4.5.2 The drivers who responded to our survey indicated that they broadly move through the space where the carriageway used to be, even in a level surface scheme (although this will require consideration in the next stage of this research).
- 4.5.3 There is therefore space at the sides of level surface streets equivalent to footways that appears to be suitable for use by vulnerable users. The unresolved question is how it, and routes across the vehicle track, can be made legible to those users.

4.6 Next Steps

- 4.6.1 This summary report has identified a number of knowledge gaps. Further analysis will be informed by contributions from the Project Board and Sounding Board. The next stage will be to develop proposals to address knowledge gaps through primary research.

5 Summary and Conclusions

- 5.1.1 This report was commissioned to determine whether a case could be made for Shared Space highway schemes, including those featuring level surfaces, and to consider whether there is evidence of value to such schemes in order to inform the Department for Transport's decision as to whether to proceed with the development of design guidance.
- 5.1.2 Based on the evidence discussed in this report, and with due regard to the evidence gaps already identified, we present in this Chapter our working conclusions following this Appraisal.
- 5.1.3 Shared Space schemes can be helpfully seen in the context of the Place and Movement matrix set out in the Manual for Streets. They are designed to assert the place functions of streets while accommodating their movement functions. To that extent, and in common with traffic management design in general, Shared Space represents a compromise between the needs of a wide range of users and uses.
- 5.1.4 To understand Shared Space while acknowledging higher level objectives and specific design features, we have adopted the framework used in DfT's recent Local Transport Note 1/08, *Traffic Management and Streetscape*. The framework headings are Vision, Purpose and Actions. Given the diversity of intention, appropriate indicators of success need to be established to reflect those intentions and we have suggested a generic set of indicators in this report.
- 5.1.5 Against these generic indicators, the evidence broadly suggests that Shared Space Schemes can deliver benefits: they appear to support economic activity, improve perceptions of personal security, be popular generally with the public and traders and increase freedom of movement for many people including some vulnerable pedestrians. In making these statements it is acknowledged that the evidence is not always conclusive and appears to vary from scheme to scheme. These conclusions need to be read in the context of the more detailed discussion set out in this report.
- 5.1.6 Shared Space is a design approach rather than a standard type of design, nevertheless the evidence suggests that some design parameters are likely to be influential in determining their performance:
- Whether they are links or nodes
 - Whether they are level surface or not
 - Whether vehicle flows are high
- 5.1.7 The ambiguity in the evidence and the varying indications among different schemes suggests that the setting and detailed design of a given scheme are likely to be highly influential in its performance.
- 5.1.8 Shared Spaces are not generic, their rationale is that they are particular. In stating a generic judgement we acknowledge that, like any highway design, specific schemes may be poorly designed or may fail to deliver clear benefits. Notwithstanding this caveat, the evidence is that a case can be made for the Shared Space design approach in general.

- 5.1.9 From the data available, there is no evidence that Shared Space schemes, including those with level surfaces, as implemented in the UK have more casualties than conventional layouts, or that particular groups, including disabled people, are injured more frequently following their introduction. However, given the inconsistent availability of data on flows of pedestrians and vehicles it is not possible to confidently present safety records in terms of risk exposure.
- 5.1.10 There is some evidence from the Netherlands that at locations with motorised traffic flow of greater than c.14, 000 vehicles per day Shared Space layouts may have more casualties, relative to traditional layouts and that risk to cyclists may be increased in these settings. It is not presently possible to verify this effect at UK sites as there are no examples of the application of Shared Space at sites with such vehicle flows and cycle flows in the UK are currently generally lower than in the Netherlands.
- 5.1.11 It is clear that in certain situations, Shared Space schemes using level surfaces deliver practical benefits over those with kerbs. Kerbs reduce flexibility of use of the space because of the segregation they provide. Where width is limited, level surfaces can make it easier to accommodate (and balance) the needs of pedestrians and people driving through it and in some situations a level surface without footways may be necessary to allow large vehicles such as refuse collectors through a street. Level surface streets can also be more readily adapted for other uses such as events, markets etc. in accordance with the frequent objective of such schemes of turning a road into a place. Level surfaces however must be considered in relation to a scheme's objectives and context and will not be appropriate in all situations.
- 5.1.12 Some categories of mobility-impaired pedestrians (e.g. people using wheelchairs, ambulant disabled people, people carrying heavy loads, and people with pushchairs) welcome the ability to travel through a step-free level surface environment.
- 5.1.13 Fear of using level surfaces can create an aversion to a particular area, regardless of actual levels of safety and this can be particularly acute among visually impaired people, although these concerns are not exclusive to them. This will need to be taken into account in design - if people are to be encouraged to enjoy the space, they need to feel they are safe using it. They also need to feel comfortable. Navigation can be a particular problem for visually impaired people and the absence of kerbs can make this more acute. Measures that assist visually impaired people in navigating streets with a level surface, and feeling safe in them, are of particular importance and we anticipate a common need to provide forms of guidance for blind or partially sighted people that allow them to navigate to parts of the street where vehicles are generally excluded. Many of these measures will use tactile paving, although other approaches, such as a common design 'language' being explored by some local highway authorities, may offer another way forward.
- 5.1.14 The reduction in formal rules for behaviour in a Shared Space environment, particularly one featuring a level surface, may be problematic for people who are particularly reliant on rules to simplify the complex street environment. Such people are likely to include younger children and some people with learning difficulties. It is important that designs provide sufficient cues for those people to use the space safely and comfortably.
- 5.1.15 In some settings Shared Space may be achieved without the need for a level surface and this is likely to avoid many of the concerns expressed by blind and partially sighted people,

although may limit the flexibility of the space and result in some loss of ease of movement for other people.

- 5.1.16 With regard to level surfaces we conclude that while they can create difficulties for some people, they can confer benefits overall, including improved access for some disabled people and, possibly, greater vehicle speed reduction. There is some evidence that a level surface with protected areas and tactile information may be more navigable and feel safer for disabled people in general compared to either a kerbed or a completely undifferentiated surface. The problems experienced by some disabled people, particularly those with a visual impairment, are not necessarily insurmountable. Good design will be important here and an approach that embraces the vision and purpose of each particular Shared Space scheme will form an essential framework within which to work. This report therefore concludes that a case can be made for level surfaces as a valid feature in some settings but that the detailed design of particular schemes needs to recognise and respond to the needs of all users.

A1. Emerging Issues

A1.1 A number of design issues emerge from the analysis so far. These are summarised in the following list which is indicative only at this point. The list will be developed alongside the primary research in the next stage of this study. The emerging issues are that:

- there is a need to take a comprehensive approach to the design of Shared Space schemes, with clear objectives as to what the scheme is meant to achieve;
- establishing a multi-disciplinary team at an early stage in scheme development is important;
- there is a need for close and continued engagement with stakeholder groups, including those representing vulnerable users;
- achieving vehicle speeds of under 20mph is likely to be important to achieving the full potential benefit of schemes;
- it may be necessary to consider traffic network design to manage the flow of vehicles such that pedestrians are willing to use the space as intended;
- schemes need to be designed in three dimensions as vertical features and cross sections can influence driver speed;
- Shared Space schemes seem likely to be most effective when they provide a comprehensive redesign of a space – just adding or removing specific design features without regard to context or integration of other design elements is unlikely to be satisfactory;
- Transition zones and gateway treatments can be useful for indicating to motorists that they are entering a place where they need to drive at low speed and with caution and to allow them time to adjust their behaviour prior to encountering significant numbers of pedestrians;
- tactile features for blind or partially sighted people are required to enable them to navigate the space;
- control of parking needs to be considered in level surface schemes;
- with level surfaces designing for drainage needs particular care because of the lack of conventional carriageway cross falls and kerbs; and
- providing surfaces in contrasting tones can assist partially-sighted pedestrians in orientating themselves within a street - colour fading, dirt, wet weather, low light etc. may affect the level of contrast.

A1.2 These considerations will be reflected in the final design guidance and will be explored in more detail in the next stage of this project.

MVA Consultancy provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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