Bristol City Council

SHARED PEDESTRIAN/CYCLE SPACE REVIEW

urban movement

RESEARCH | PLANNING | STRATEGY | DESIGN

MAIN REPORT

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March 2015

Preface

The broader context for this study is set by the draft Bristol Cycling Strategy. It describes the challenge the city faces as being "to create a comprehensive network of cycle routes that are accessible for everyone aged 8-80".

Amongst other things, the strategy establishes a 2020 cycling mode share target of 20% both for commuter trips to/from the city centre and for pupil trips to/from all secondary schools. This ambition should be considered in the light of the following:

- Bristol's overall journey-to-work cycling mode share in the 2011 census was 8.2%. While this compares favourably with the majority of other UK cities, it is well below half the target figure.
- The 2015 cycling mode share for the two target trip types is unknown. The city centre commuting figure is likely to be higher than the city-wide figure from the census; the secondary school pupils figure is probably lower.
- Based on the above, the 20% targets for 2020 represent something like a doubling of existing commuter trips, and a much higher multiple for pupil trips to/from secondary school.

It is clear that, if the ambitious targets are to be met, then the city's streets must become much more attractive for cycling, especially to people who currently do not cycle.

UK and international research reveals that the main factor putting people off cycling is concern for their safety. This is referred to as 'subjective safety' and is not directly related to knowledge of road safety statistics. Essentially, people won't cycle if they feel it's unsafe to do so. Surveys suggest people do generally feel it's safe to cycle if one of the following conditions applies:

- there are separate, protected cycle tracks on streets with high traffic volumes/speeds;
- traffic volumes/speeds are both very low; or
- there is no motor traffic.

The first two conditions can be difficult to create, for traffic management, cost and other reasons. Consequently, the default UK option for providing safer cycling has too often tended to be to let cyclists share traffic-free streets with pedestrians, or to share footpaths. However, if the conditions aren't right, sharing can create a poor experience for both walking and cycling; and much UK shared pedestrian/cycle space is an unhappy and awkward compromise.

Decisions about whether and how to share traffic-free streets must be evidence-based; while design should be the product of collaboration between different disciplines and real engagement with the needs of both user groups. This study is intended to help inform both the decision-making and design processes in Bristol.

1. INTRODUCTION

Background

In recent years, Bristol City Council has implemented a number of public realm schemes in the city centre where people on foot and on bicycle share the space. A plan of these spaces is shown on page 4, overleaf.

The Council recognises that this provision constitutes something of a 'patchwork quilt' of pockets of shared space; and it also receives complaints from some users and user groups that some spaces do not work well for them. These concerns vary from space to space.

Accordingly, the Council commissioned this independent review of shared pedestrian/cycle space, to cover the following elements:

- a review of relevant literature (details in the companion report on Reference Documents);
- an exploration of the lessons that Bristol might learn from shared pedestrian/cycle spaces in other cities (details in the companion report on Case Studies);
- a review of the current operation of certain street/spaces in Bristol city centre;
- the preparation of good practice guidance for Bristol, covering design principles and techniques; and
- the application of this guidance to the design of a specific street/space, as a pilot scheme.

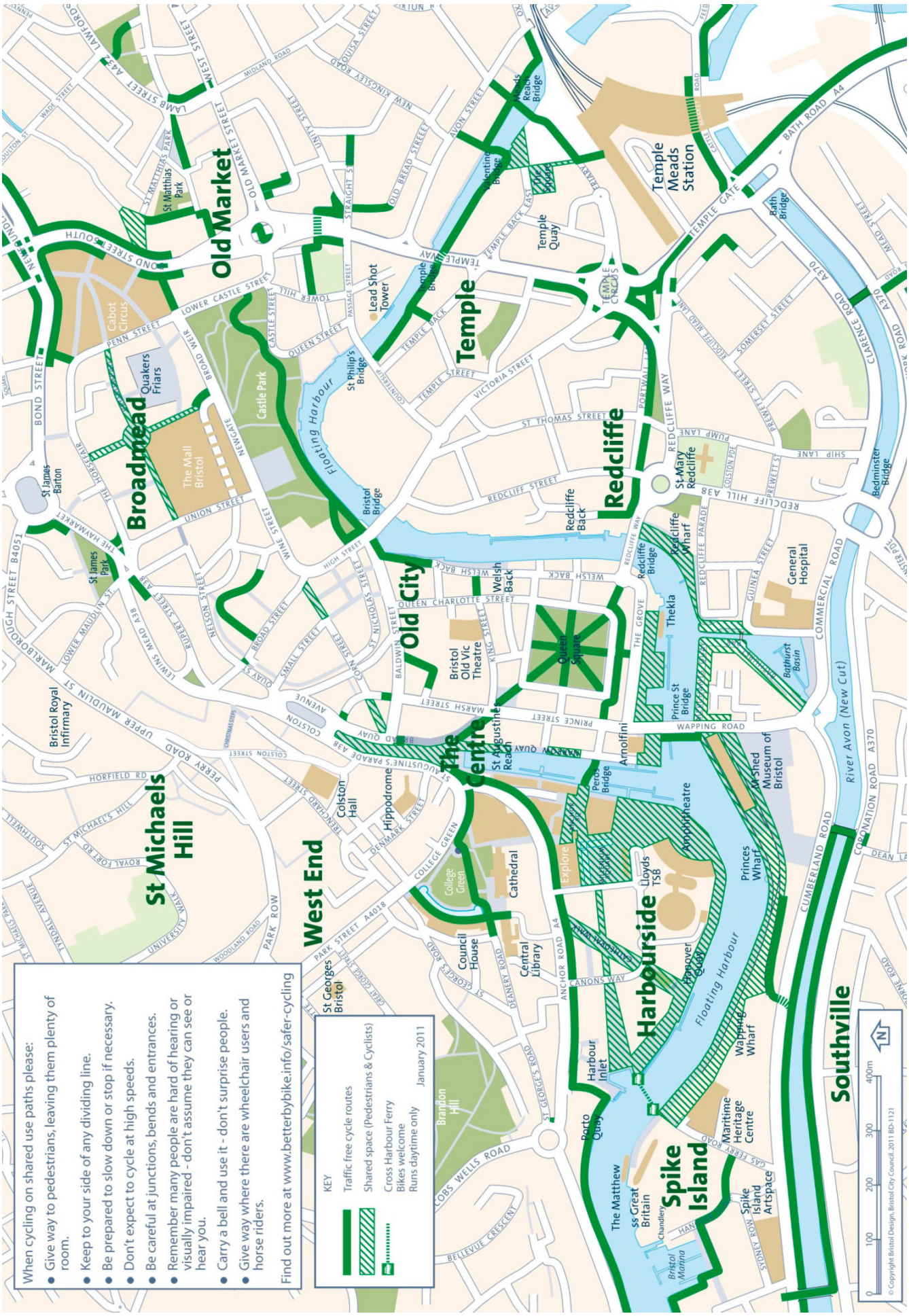
Overall, the intended outcome of the review is an approach that will assist the City Council in developing a city centre cycling network that:

- is fit to meet the Council's ambitions for cycling;
- ensures the city centre remains easy, safe and comfortable for all people to walk about; and
- is designed in ways that respond positively to the local built environment context.

Study Process

In order to achieve the desired outcomes, the study encompassed the following tasks.

- Familiarisation with principal shared streets/ spaces within the study area (see plan on page 4), including visits on foot and by bike, and preparing a photographic inventory.
- An initial workshop with various Council officers to establish different perspectives on current concerns and possible responses.
- Review of available video footage of activity in Broadmead and at the crossing of Welsh Back linking Queen Square and Redcliffe Way.
- Review of a range of comparable shared spaces elsewhere in other UK and European cities, using examples known by the author.
- Comprehensive review of reports and other documents having relevance to the design and management of shared pedestrian/cycle space, including methods of determining the suitability of sharing.
- A second workshop with Council officers, to review work to date and discuss the implications for their work generally and in relation to the redesign of The Centre as part of the Bristol MetroBus scheme.
- Additional meetings with Council officers, as necessary.
- Preparation of a Main Report, with guidance on design principles and a generic approach to shared pedestrian/cycle space in Bristol.
- Preparation of companion reports on the Reference Documents and Case Studies.
- Final presentation/workshop with Council officers, including discussion on the application of the guidance in The Centre.


When cycling on shared use paths please:
• Give way to pedestrians, leaving them plenty of room.
• Keep to your side of any dividing line.
• Be prepared to slow down or stop if necessary.
• Don't expect to cycle at high speeds.
• Be careful at junctions, bends and entrances.
• Remember many people are hard of hearing or visually impaired - don't assume they can see or hear you.
• Carry a bell and use it - don't surprise people.
• Give way where there are wheelchair users and horse riders.
Find out more at www.betterbybike.info/safer-cycling
KEY
Traffic free cycle routes
Shared space (Pedestrians & Cyclists)
Cross Harbour Ferry
Bikes welcome
Runs daytime only
January 2011
Old Market
Broadmead
Temple
Redcliffe
Old City
The Centre
St Michaels Hill
West End
Harbourside
Spike Island
Southville
Floating Harbour
River Avon (New Cut)
Bristol Bridge
St Philip's Bridge
Lead Shot Tower
Temple Quay
Temple Meads Station
Castle Park
The Mall Bristol
Cabot Circus
Quakers Friars
St James Barton
St James Park
St Matthias Park
Bristol Royal Infirmary
Colston Hall
Hippodrome
College Green
Cathedral
Council House
Central Library
St Georges Bristol
Brandon Hill
Bristol Old Vic Theatre
Queen Square
Welsh Back
Redcliffe Back
Redcliffe Wharf
Redcliffe Bridge
St Mary Redcliffe
General Hospital
Bathurst Basin
Bath Bridge
Bedminster Bridge
Prince St Bridge
Pero's Bridge
Arnolfini
Amphitheatre
Lloyds TSB
Harbourside
Harbour Inlet
Porto Quay
Wapping Wharf
Princes Wharf
M Shed Museum of Bristol
Maritime Heritage Centre
Spike Island Artspace
The Matthew
ss Great Britain
Bristol Marina
Thekla
Canons Way Bridge
Cumberland Road
Wapping Road
Bath Road A4
Clarence Road
Temple Way
Temple Gate
Redcliffe Way
Redcliffe Hill A38
Bond Street
Broad Weir
Lower Castle Street
Old Market Street
Lamb Street
Park Street A4018
Perry Road
Upper Maudlin St
Marlborough Street B4051
Colston Avenue
Denmark Street
College Green
Great George Street
Anchor Road A4
Cannons Way
Cobb's Wells Road
Bellevue Crescent
Coronation Road A370
Commercial Road
Redcliffe Parade
Somerset Street
Victoria Street
Temple Street
Temple Back
Temple Back East
Redcliffe Street
St Thomas Street
Queen Charlotte Street
Marsh Street
Prince Street
Welsh Back
Baldwin Street
Broad Quay
Corn Street
Wine Street
Nelson Street
Union Street
Queen Street
Castle Street
Tower Hill
Passage Street
Straight St
Old Bread Street
Avon Street
New Kingsley Road
Unity Street
Midland Road
Lewins Mead A38
Ruskin Street
Christmas Steps
Colston Street
Lower Maudlin St
The Horsefair
The Haymarket
Penn Street
Bond Street
Wade Street
Lawford Street
Pump Lane
Ship Lane
Guinea Street
Colston Pde
Portwall Lane
Cumberland Road
Dean Lane
Gas Ferry Road
Stoney Road
Hanover Quay
Canons Way
Anchor Road
Great George Street
St George's Road
Denmark Street
Woodland Road
Park Row
Horfield Rd
St Michael's Hill
Royal Fort Rd
Tyndall Avenue
University Walk
Southwell
Lower Maudlin St
Lewins Mead A38
Ruskin Street
Nelson Street
Broad Street
Small Street
Quay St
Colston Avenue
Christmas Steps
Colston Street
Baldwin Street
Marsh Street
Prince Street
Welsh Back
Queen Charlotte Street
Redcliffe Way
Redcliffe Parade
Redcliffe Street
Redcliffe Hill A38
Pump Lane
Ship Lane
Guinea Street
Commercial Road
Coronation Road A370
Cumberland Road
Wapping Road
Bath Road A4
Clarence Road
Temple Way
Temple Gate
Temple Back East
Temple Back
Temple Street
Victoria Street
St Thomas Street
Redcliffe Street
Queen Street
Castle Street
Tower Hill
Passage Street
Straight St
Old Bread Street
Avon Street
New Kingsley Road
Unity Street
Midland Road
Lamb Street
Penn Street
Bond Street
Wade Street
Lawford Street
Broad Weir
Lower Castle Street
Old Market Street

2. SHARING + SEGREGATING

The initial workshop with Council officers included a discussion about the pros and cons of, on the one hand, letting cyclists share space with pedestrians and, on the other, of providing cyclists with their own, segregated space. This related specifically to motor traffic-free streets. It was not to inform decisions about whether sharing or segregation would be the best choice in any specific street/space. Rather, it was to enable debate at the level of principle, and to make clear the need for choices to be made on a rational basis, not for reasons of either expediency or dogma.

The lists below represent the outcomes of that discussion. They therefore make no claim to be the last words on the matters at issue. The number of bullets in each of the lists is no reflection of relative importance.

SHARING

Pros

- Space-efficient, especially where flows of pedestrians, cyclists, or both are low; and therefore where either or both of a separate footway & cycleway would be under-utilised.
- Generally enables a more cohesive, harmonious streetscape design (including visual impact)
- Allows both user groups to use one street/space where there is currently no practical alternative and where the only option (at least in the short term) would be to ban one group (usually cycles)
- Promotes civility (arguable)

Cons

- Possible user confusion and perceived conflict, which affect comfort and subjective safety (especially of pedestrians). If pedestrians think 'it's the footway', they expect not to be asked to mix with any vehicles, including cycles
- Can be a particular problem for blind and partially-sighted user groups
- Actual user conflicts – potential for collisions
- May lead to a demand for enforcement (for which there are very limited resources)
- Can reduce the attractiveness of just being in the space – movement dominating 'place'; interaction with cafes/events may be a problem
- Cyclists can be impeded in making reasonably smooth progress
- Can compromise cycling legibility
- Promotes incivility (arguable)

SEGREGATING

Pros

- People in each user group know where they are (or, at least, where they're supposed to be) – so there is less confusion
- Generally greater subjective safety (for both user groups)
- Cycling speeds can generally be higher
- Simple in conceptual terms
- Better legibility for both groups (routes ahead tend to be clear)

Cons

- Can makes streets seem more like 'technical areas', rather than places for people
- Generally needs more space than sharing
- Interfaces/junctions tend to get more complex, as there are two streams of movement to design for, not one combined stream
- Certain forms of segregation can create barriers/trip hazards for walking
- Faster cycle traffic can itself be a barrier to pedestrian crossing movement
- Engineering measures may make segregation more costly than sharing

One particular drawback was considered common to both sharing and segregating pedestrian and cycle movement in a motor traffic-free street. This is the problem of trying to ensure that people in any given street will do what they're supposed to do. The choice concerning whether to share or to segregate must take into account the role of design in enabling people to comply. Simply to 'put up the signs' and assume that all will go as intended is likely to lead to failure.

As a final comment, it is worth noting that, in view of the issues identified above, making the decision to share can seem to be the easy one to make when space and funds are scarce. However, making the best decision will necessitate weighing all these factors, including the user experience. In some instances, the decision to share space in one street should be consciously temporary and embrace the need to create good conditions for cycling in a suitable alternative street.

3. BRISTOL SHARED SPACES

The plan on page 4 identifies those streets and spaces in central Bristol where there is some form of sharing between pedestrians and cyclists. This section of the report presents a brief illustrated account of some of these spaces, with captions drawing attention to various issues of relevance to this review.

Videos of pedestrian/cyclist interactions in Broadmead and at the Welsh Back crossing on the Brunel Mile have also been studied. With the caveats that these videos necessarily only cover comparatively short periods, and that they can't show what users actually felt like under the conditions observed, the videos do not raise any specific issues of concern beyond those arising from the other strands of this study.

Broadmead. Signs on entry read: 'SHARED PATH: Please consider other path users.'

Broadmead: This sign at the west end spells out the 'Pedestrian Zone' access controls in more detail.

The central area of Broadmead has fixtures in it that tend to focus movement to one side or the other.

Pedestrian and cycle flow densities in Broadmead mean that sharing is typically harmonious, but...

...there are times when it would be just as quick (and arguably wiser) to push your bike, rather than ride it.

The south (Brunel Mile) side of Queen Square has subtle delineation that is not strictly observed. In...

...the square, people tend to walk/ride wherever they choose. This sign hints at no cycling on the diagonal.

The link from Queen Square to Welsh Back, and the crossing, is fully shared. On the Redcliffe Way side...

...there's a transition to the segregated bi-directional cycle track on the bridge, which then connects with...

...the shared path along Portwall Lane, where walking flows at peak times can make sharing uncomfortable.

At Temple Quay, the signs and marking are confusing: "Cycle here. Station this way. But no, wait. Get off."

The main part of The Centre has paths alongside and across the water feature that are often busy with..

...pedestrians. While all seem to be used as though they are shared pedestrian/cycle space, the only...

...sharing signs - small stickers - seem to be placed in the hope/expectation that north- south cycling will...

...take place only/principally along the western edge of the space, adjacent to St Augustine's Parade.

The southern part of The Centre is perhaps where sharing is most problematic. This is because it is a...

...busy east-west (Queen Square-College Green) cycle route, a focus of pedestrian activity in all directions...

...and a place where people like to just hang around and where installations/events often happen. The...

...surface treatment is also confusing. What looks like a cycle path is actually a smooth wheelchair route.

The route between The Centre and Queen Square is complicated by crowds at bus stops and steps/walls...

...and where space is less contested, there may be a case for marking separate walking and cycling paths.

Despite the new cycle track in eastern Baldwin Street, the link to The Centre at its west end is poor. At the...

...east end of Baldwin Street, these courtesy crossings emphasise walking priority across the cycle track.

Across from Baldwin Street, in Castle Park, there is a footpath next to a cycle path. Differentiation is...

...subtle for the most part, and when pedestrian flows are high, people often walk in 'the cycling bit'.

Lower Castle Street is one of several locations where cycling is permitted on relatively wide 'footways'...

...with small '956' signs indicating the fact. Similar arrangements exist in Bond Street and elsewhere.

This staggered crossing of Bond Street South is a Toucan, so formally shared. It links directly to the...

...Champion Square. This is a space that's also shared with very low flows of slow-moving motor vehicles.

The Lamb Street footway is narrow, so some people walk in the distinct cycle path. When sharing starts...

...at the West Street junction, the hard-to-spot '956s' and lack of cycles on the push-buttons are confusing.

The north (here) and south ends of Corn Street are legally shared, but no physical measures or signs...

...indicate any 'rules of engagement'. People on foot and bike seem to read and respond to the conditions.

Straight Street. Painted markings and a dropped kerb focus cycling on a 'cycle path' in different materials...

...in which people also often walk. The sign advises cyclists to 'cycle with care'.

4. REFERENCE DOCUMENTS

A review was undertaken of several documents having relevance to the design of streets and spaces where movement on foot and by bicycle is permitted, but where access by motor vehicles is largely restricted. The types of document reviewed included national guidance, research reports, policy statements, other summaries and think pieces. The documents in question are:

- Shared Use Routes for Pedestrians and Cyclists – Local Transport Note 1/12. (DfT, Sept 2012)
- Shared Space – Local Transport Note 1/11. (DfT, Oct 2011)
- Cycling in Pedestrian Areas – Traffic Advisory Leaflet 9/93. (DfT, Aug 1993)
- Adjacent and Shared Use Facilities for Pedestrians and Cyclists – Local Transport Note 2/04. (DfT, 2004)
- Design Manual for Bicycle Traffic (CROW, Netherlands; English Version, 2007)
- Pedestrian Comfort Guidance for London (Mayor of London/Transport for London, 2010)
- Cycling in Pedestrian Areas – TRL Report PR15. (P Trevelyan & JM Morgan, Jan 1993)
- Cycling in Vehicle Restricted Areas – TRL Report TRL 583 (DG Davies, L Chinn, GS Buckle & SJ Reid, 2003)
- Pedestrians and Cyclists – Policy Briefing 03/09. (Living Streets, Nov 2009)
- Cycling and Pedestrians –Campaigns Briefing 4R. (CTC, Jan 2014)
- Vehicle Restricted Areas – Design Portfolio A.07. (Cycling England, 2009?)
- Cycling in Pedestrian Areas – List of UK Locations. (Cycling England, 2009?)
- Cycling in Pedestrian Areas – Facts and Guidelines: summary of research published by Fietsberaad in 2005. (Ing. Hans Godefrooij)
- The Merits of Segregated and Non-Segregated Traffic-Free Paths – report to Sustrans (Phil Jones Associates, August 2011)
- London Cycling Design Standards (Mayor of London/Transport for London, December 2014)

A Reference Documents report has been prepared as a companion to this Main Report. It provides relevant highlights of each document and attempts to distil their chief findings, as they relate to this review of how best to make provision for walking and cycling in different types of traffic-free spaces in central Bristol. The Summary + Conclusions section of that report is reproduced below.

SUMMARY + CONCLUSIONS

Although the reference documents are varied, in terms of such factors as their type, source, age and focus, they are - viewed as a whole - surprisingly consistent concerning a number of important messages that arise directly or can very reasonably be inferred. These are as follows.

- Decisions on whether pedestrians and cyclists should reasonably be expected to share the same street or space must take into account local conditions; as well as consideration of how these conditions may change in the future.
- There is no simple formula or calculation by which the decision to share or not share can readily be determined.
- That said, decisions should be based on a rational assessment of the density of flow of both pedestrian and cyclists in the context of the physical space constraints in the location in question (e.g. the width available for longitudinal movement).
- Research shows that cyclists can very largely be trusted to adapt their behaviour appropriately to the presence of pedestrians.
- Research also shows that incidence of cyclists causing physical harm to pedestrians, especially in vehicle restricted areas, is very low.

- Subjective concerns on the part of pedestrians about the danger posed by cyclists are important considerations, but should be addressed in the context of the objective evidence.

- If the decision is taken to (continue to) permit cycling in a vehicular restricted area, the choice of whether or not to mark a path for cyclists should be based on local considerations such as: relative pedestrian and cycle flows; whether the area is a street, a destination space, or a combination; the effective width available for longitudinal movement; and the flow of pedestrians across the main cycle flow.

- Where it is decided to mark the cycle path in some way, the choice of design should likewise be context-specific; and should recognise both that pedestrians will occasionally wander into the cycle path and that cyclists will not always stick rigidly to it.

- The principal value of marking a cycle path is to clarify the part of the space where the great majority of cyclists are likely to be encountered, and also to legitimise cycling in the eyes of pedestrians who might otherwise think 'their' space is being invaded.

- To assist harmonious interaction between the two user groups, signs should clearly indicate that the space is shared and, where necessary, that pedestrians have priority.

- No disproportionate attempts (e.g. excessively low speed limits or warning/threatening signs) should be made to cyclists keep to 'their' bit and pedestrians to 'their' bit. Where such measures are genuinely considered desirable or necessary (as opposed to being a reaction to anecdotal concerns), this will typically be a sign that sharing is inappropriate in that location.

- If the rational decision is taken to exclude cycling from any given area, whether full- or part-time, a suitable alternative cycling route should be provided. If it is not, either or both of two eventualities can be expected: some cyclists will infringe the ban; and/or the potential for cycling will be suppressed (with negative transport policy implications).

- Where an alternative route for cycling is needed, it must be adequately direct, comfortable and convenient, and part of a clear city cycling network that responds to the existing and future demand for cycling between different origins and destinations.

- Where no adequate alternative route can easily be provided in the short term, a policy that seeks to promote more cycling as a form of everyday transport for all must embrace significant investment in order to create an attractive alternative as quickly as possible.

In the UK to date, decisions to let pedestrians and cyclists share the same street, space or footway have too often arisen from the inability or unwillingness to invest in a better solution; and an unhappy compromise has been the typical outcome. Together, the reference documents make plain that any policy to seriously promote cycling must ensure that sharing only takes place where the conditions are suitable; not because the alternative is 'too hard' to deliver.

5. CASE STUDIES

A brief study was made of how pedestrian/cyclist interactions are handled in a selection of largely traffic-free streets in different European cities. They are places where the definition of a path for cycling is either subtle, very subtle, or non-existent. The author has visited each street featured, but detailed statistics and other evidence about the daily experience of pedestrian/cyclist interactions was not obtained within the constraints of this piece of work. Comments are based primarily on observations over relatively short periods on single visits. The cities and streets in question are:

- (UK) London: Byng Place, Camden
- (UK) London: North End, Croydon
- (UK) London: Islington Green
- (UK) London: Spital Square
- (UK) London: Station Forecourt, Kingston
- (UK) London: Castle Street, Kingston
- (UK) Peterborough: Bridge Street
- (UK) Cardiff: Lloyd George Avenue
- (Spain) Barcelona: Carrer d'Enric Granados
- (Spain) Seville: Avenida de la Constitucion
- (Spain) Seville: Calle Asuncion + Avenida Republica Argentina
- (Germany) Berlin: Unterwasserstrasse
- (Germany) Munich: Am Harras
- (Sweden) Stockholm: Stromgatan
- (Sweden) Gavle: Drottninggatan

A Case Studies report has been prepared as a companion to this Main Report, and this contains an illustrated bulletin on each case study street. The Summary + Conclusions section of that report is reproduced below.

SUMMARY + CONCLUSIONS

A variety of design techniques is used to manage the interaction of pedestrians and cyclists in motor traffic-free streets and spaces. These range from undifferentiated surfaces, through the use of features to denote a notional cycle path, to the clearer designation of one part of the street for walking and another for cycling.

A range of formal and informal signs is also deployed, some advising the legal status concerning access, others emphasising priority for pedestrians, and others indicating (advisory) speed limits. Some streets also have timed restrictions on cycling access, e.g. during core shopping hours or when markets take place.

While there are some objective methods for assessing the appropriateness of sharing between pedestrians and cyclists (based on flows relative to available width - see the companion Reference Documents report), very little information has been obtained concerning how or why design or management decisions were made for each case study street.

None of the case studies is from the Netherlands, since the author's study tours of Amsterdam, Utrecht and Houten revealed very little space that is shared by pedestrians and cyclists. (That which was found was usually either a path through a park or a short, traffic-free link between two streets.) One reason is that Dutch cycling are often so high that sharing is inappropriate. Another is that the Dutch approach to network management is good at creating 'Cycle Streets' where motor traffic volumes and speeds are so low that cycling in the 'carriageway' is safe and attractive and so does not need to be mixed with walking.

Taken together, the case study streets show that, in practice, there is no clear dividing line between 'fully shared' pedestrian/cycle space and 'fully segregated' pedestrian and cycle paths. What is found is more of a continuum, with undifferentiated single surfaces at one end physically separate footways and cycle tracks at the other. What changes along this continuum is the subtlety with which a route or path for cycling is marked, the level of expectation of observance of this path (by both user groups), and the methods used to require cyclists to adhere to this path.

Where the design of any given street/space lies along this continuum is determined according to local circumstances; and to find the best approach it will always be helpful to answer the following two key questions:

Q1. Taking into account the physical constraints of the space in question, are the levels of movement on foot and by bike suitable for sharing? This question concerns the density of flows, not just the volumes.

Q2. If the answer to Q1 is 'yes' then, taking into account the local context, what is the best response in terms of design and management?

The companion report on Reference Documents identifies some methods to help answer Q1, and these are considered further in section 6, below.

If the answer to Q1 is 'no', thoughts must turn to whether clear segregation of users in that space is appropriate, or whether provision for cycling should be made in a suitable alternative location.

If the answer to Q1 is 'yes', the answer to Q2 will depend on local factors like the sensitivity of the built environment, the nature of fronting land uses, and the patterns of pedestrian and cycling activity. So, for example, streets in Conservation Areas may require a different treatment from those that are not; shopping streets will not be treated in the same way as routes through parks; and designs where walking and cycling is largely parallel will differ from those where pedestrians often cross the main cycling desire line.

Concerning the more detailed aspects of street design and management, the case studies draw attention to the following issues:

- Where a 'cycle path' is marked in some way, cyclists do not always keep scrupulously within that path; and this is commonly because pedestrians do not always stay out of it.

- Generally, marking a subtle cycle path through a shared space seems to work best as a means of legitimising the presence of cyclists where pedestrians have priority, but not sole rights. There should be no expectation of rigid observance of the path by either user group.

- Whatever markings or signs there may or may not be, the approach to sharing that applies in every case study street is essentially as follows: "This is a pedestrian space in and through which cycling is permitted." In other words, people on foot have priority, and people on bikes should adapt their behaviour accordingly.

- It is important to avoid signs that require cyclists to act in ways that are impractical; e.g. to keep to a path that is too narrow or often blocked by pedestrians, or to ride as slow as 5mph. Such signs will likely introduce conflict between pedestrians and cyclists ("my space/ your space"), not resolve it.

- Decisions to restrict cycle access to certain time periods require full consideration of their potential implications. While such restrictions may not be unreasonable in themselves (e.g. because the street becomes too crowded with pedestrians at times), suitable alternative provision for cycling must either already exist or be made.

- Whether part- or full-time, where cycling is prohibited in any given street, the failure to provide suitable alternative routes for cycling will likely produce one or both of two outcomes: cyclists will flout the restriction; and/ or people will be discouraged from cycling (and hence policies to grow cycling will not be achieved).

- The scope of this particular commission has meant that it was not possible, in most locations, to explore the basis for decisions concerning the design and management regimes observed. However, media reports concerning the extension, from six days a week to seven, of the 9am-6pm ban on cycling in Peterborough's Bridge Street, highlight the general issue of the need for decisions to be rational and evidence-based

- In the Peterbrough case, the decision appears to have been taken chiefly because "Many people have reported or witnessed near misses between shoppers and irresponsible cyclists", and despite both a strong public consultation response in opposition to the proposal, and the lack of consideration of an alternative route.

- Anecdote concerning a minority can, in practice, undermine a rational approach as to what is best for all. It is essential, therefore, for any decision about where and how to share space between pedestrians and cyclists is made using facts about activity, not just 'reports'. It is also strongly recommended that an objective method is employed to assess pedestrian and cycle flow densities, in the context of the physical constraints and other characteristics of the street/space in question.

6. DESIGN GUIDANCE

This section of the report attempts to distil the lessons from the reference documents and case studies into guidance that will be helpful for application in Bristol. It is intended to inform the choice as to whether or not a motor traffic-free space should be shared by pedestrians and cyclists; and then, if the choice is to share, to inform decisions about the best design for the purpose.

Principles

- Making good provision for cycling must not compromise the provision of good conditions for walking. Where pedestrians and cyclists are required to share a space in a way that is bad news for the former, it is almost always also bad news for the latter. The views of user group representatives should always be sought.

- If requiring pedestrians and cyclists to share the same space creates poor conditions for either, this should be considered unacceptable as a long term solution. Cost, traffic capacity and other challenges should not be a veto on making adequate separate provision for both.

- Provision for both walking and cycling should reflect their position in the Council's user hierarchy and should be such as will achieve the Council's transport policy priorities and mode share targets.

- It is essential that decisions about whether or not to share have a rational, objective basis. This is so that, for example, decisions to share space are not taken as being simply the most expedient; and that decisions not to share do not stem from the subjective interpretation of 'interaction' as 'conflict'.

- To this end, Bristol should adopt a simple method for gauging the appropriateness of sharing, based on the assessment of absolute and relative flows and densities of movement on foot and by bike in any given space. (The Dutch CROW Manual and TfL's London Cycling Design Standards and Pedestrian Comfort Guidance are helpful sources.)

- The use of such a method requires flow data derived from place-specific surveys during key time periods and from adequately evidenced predictions of growth.

- Generally, decisions about where and how best to accommodate cycling should be made in the context of a clear, city-wide cycle network plan.

- The cycling network plan should clearly identify all motor traffic-free streets where the level of pedestrian activity (properly measured) means that cycling should not be permitted.

- Similarly, the network plan should identify all 'trunk cycle routes' (the top tier in the cycle route hierarchy, defined by design cycle flows and speeds) where occasions on which cyclists should need to stop or yield are to be minimised, and therefore where sharing with pedestrians is inappropriate.

- The length of shared sections is a key consideration. It may be reasonable to share relatively crowded space for a short distance where otherwise separate walking and cycling routes come together at a 'pinch-point'. Both ends of Corn Street and Castle Street in Kingston (see Case Studies report) are examples of this arrangement.

- Wherever the assessment method suggests that pedestrians and cyclists should not share the same motor traffic-free space, active consideration must be given to the alternatives.

- Alternatives will generally fall into one of two categories: (a) clearly segregating a cycle track through the space; or (b) excluding cycling from that space.

- In considering (a), the design must be such that there is a reasonable expectation that people in both user groups will find it convenient and easy to identify which part of the street is for them, and to stick to it. Any negative impacts of segregation measures on pedestrian movement (especially for people with impaired mobility) and on visual amenity should be minimised.

- If the decision is taken to exclude cycling (b), active consideration should at once be given to how attractive any routes for cycling are, in terms of directness, safety, and speed.

- Where no suitably attractive alternative cycling route is presently available, the creation of such an alternative should become a high priority.

- Allowing cyclists to share a street that is too busy with pedestrian activity, and requiring cyclists to use an unattractive alternative route are equally undesirable. They should only be considered as temporary measures.

- Creating suitable alternative routes for cycling may be costly, or otherwise problematical. However, a policy to grow cycling as transport must face such challenges and be supported by a long-term, well-funded commitment to creating appropriate infrastructure. The quality of cycling (and pedestrian) environments must not be compromised by trying to 'do our best' in the absence of substantial interventions.

Design

- The design of shared space (indeed all streets and spaces) should respond to how people do behave when they're out on foot or on their bikes, not to how we wish they would behave.

- In shared pedestrian/cycle space, there must be clarity for both user groups about the terms of engagement. There should be no confusion about rights of access, relative priorities or routing. This relates to ensuring safety, encouraging civility and promoting legibility.

- All designs for shared pedestrian/cycle space should respond to the local context: patterns and volumes of walking and cycling activity; how the space is used as a place; the adjacent land uses; and the built environment character.

- Designing for longitudinal movement and for interactions where paths cross are different challenges. The layout of any street/space must reflect this complexity, where it is found.

- Design must respond to the role of any given street/space in the cycling network hierarchy. The terms of cycle access to streets that are principally destinations will be different from those that are part of key commuter routes.

- Arising from this, categorising the terms of cycling access in different shared spaces may help give clarity to design decisions. For example, streets like Broadmead and Corn Street might have 'Permitted Cycle Access', while streets and spaces along the Brunel Mile might have 'Priority Cycle Access'.

- Counts of existing pedestrian and cycle flows, at different times of the day and days of the week, should be key design influencers; as should forecasts of growth in both. The Dutch CROW Manual and the London Cycling Design Standards provide starting points for how to relate design decisions to flow.

- Flows must be considered in the context of available width (i.e. flow density is the key). As the CROW Manual points out, assessment of width must take into account the presence of obstacles like cafes and bicycle racks.

- Bristol should seek to clarify its own guidance on this matter, covering both whether or not to share and how to share. This would enable decision-making on a basis such as the following:

  - Pedestrian Density X + Cycle Density A = Design Option 1
  - Pedestrian Density X + Cycle Density B = Design Option 2
  - Pedestrian Density Y + Cycle Density B = Design Option 3

- Markings or differential materials can be used to denote a path for cycling through a shared space. Depending on the context, the intent may be to encourage and enable pedestrians and cyclists to avoid travelling in the same part of the space, or it may simply be what the LCDS refers to as a "subtle way of legitimising cycling" in the street in question.

- The choice of materials or markings used to denote a cycle path should, as with the design as a whole, respond to the character of the local built environment.

- It is vital that the design - and any supporting signs - does not require either cyclists or pedestrians to act in ways that are impractical or unlikely.

In conclusion, decisions about whether and how to share must be fully informed by relevant data; but cannot be determined by numbers alone. Designs must be context-specific and the design process should be collaborative, involving professionals with different backgrounds and responsibilities, and also representatives of the user groups who will, when the scheme is built, be doing the sharing.

7. APPLYING THE GUIDANCE

The context for this study is the City Council's ambition that, by 2020, 20% of commuter trips to/from the city centre will be by bike, as will 20% of pupil trips to/from all secondary schools. To achieve this target will mean that the city's streets must become much more attractive for cycling, especially to people who currently do not cycle.

In this regard, the implications of this study are essentially twofold: that pedestrians and cyclists should only be required to share the same space where it is comfortable and convenient for both user groups to do so; and that, where sharing is not possible on these terms, suitable alternative provision for cycling will need to be made. This will require difficult decisions to be made, significant sums to be invested, and unhappy compromises to be avoided. The difficult decisions will relate to many factors, including funding, traffic capacity and the integration of cycling infrastructure with the wider townscape.

To facilitate the engagement of Council officers with such decisions, a workshop was held to discuss the study findings and consider how to go about applying the design guidance to the motor traffic-free space in The Centre. This location was chosen partly because of its importance and complexity, and partly because significant change is currently proposed there, as part of the Bristol MetroBus scheme.

The workshop was not about agreeing design details, as the necessary data was not available. Rather, the emphasis was on developing a shared understanding of the principles, and on engendering a collaborative design approach. Participants were from the City Design, Strategic Transport, Engineering Design, Cycling Design, Planning, Sustainable Transport, Road Safety, and Equalities Advice teams. Having a broad range of professional interests around the same table is vital, since the design of complex urban environments should never be the province of just one discipline, or dominated by one mode or one issue. This fact is all the more obvious when the sharing of space by different user groups in a historic built environment is under review.

The plan on page 21 is a simplified version of the latest Metrobus proposals for walking and cycling routes. It highlights two locations on which discussions focused.

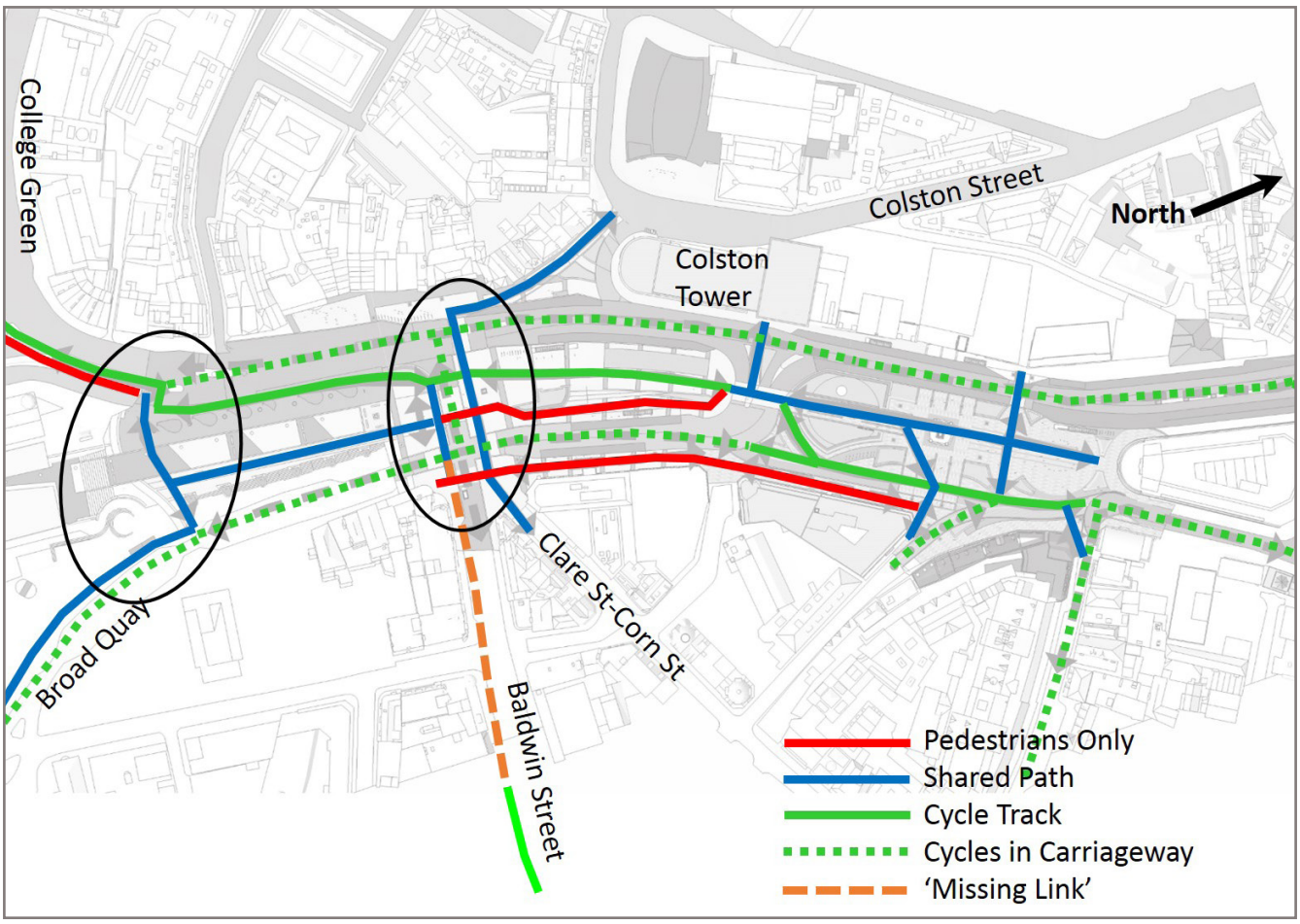
The southern location is especially complex (see the photos on pages 10 and 11). It's an area where there is a strong east-west cycling desire line between College Green and Broad Quay (which links onwards via Queen Square to Temple Meads). The space also facilitates north-south cycling and is a location where pedestrian movement occurs in almost every conceivable direction. Added to all this, it's an important city centre space, where people gather for all sorts of reasons and many formal and informal events take place throughout the year.

There was general agreement that the nature and use of the space - with no simple, single axis of movement - does not lend itself to the implementation of segregated cycle tracks through the space. A particular issue highlighted was that of the regularity of walking and cycling movement across, rather than alongside, the main east-west cycling desire line. There was unanimity that the space was suitable for sharing.

As regards change to existing arrangements, the consensus was that the east-west cycling path should be marked so as to alert pedestrians to the flow of cyclists but not to imply that cycling has priority. The current layout is confusing in this regard, since the smooth wheelchair/buggy path (between rougher setts to either side) reads like a cycle path, suggesting that the east-west cycle route runs via the signalised crossing to the east side of Broad Quay, rather than along the shared path on the west side.

This shared path is itself rather problematical, as it requires cyclists to squeeze between the often crowded waiting area at the northbound bus stop and the adjacent steps/ramps complex. It was agreed that there is scope to remedy these problems, with different options having different cost and engineering constraints. For example, the bus stop could be moved or the steps/ramp complex redesigned.

Overall, there was agreement that the current layout of this southern part of The Centre is sub-optimal for most users, and that there should be greater clarity. The general terms of engagement - that the space is shared - should be obvious to all; and better identification of the busy east-west cycle route should help pedestrians to be fully aware of it, and cyclists to be able to negotiate it without confusion.



The northern space is challenging in different ways, not least because the MetroBus proposals involve the creation of a new east-west general traffic route across The Centre, opposite the junction with Baldwin Street. This means that people walking and cycling north-south through The Centre will now have a crossing to negotiate. A single, shared signalised crossing point is currently proposed, but there are a number of issues with this crossing and the proposed walk/cycle routes on either side.

South of the crossing, as the plan shows, there is both a shared north-south path (shown as blue - through the middle of the space) and a separate north-south cycle track (shown green - on the western edge). North of the crossing, the cycle track continues, but the path up the middle is for pedestrians only. Added to the design challenge is the desirability of making a better cycling connection between The Centre and the new cycle track on Baldwin Street (the 'Missing Link' on the plan); and there is also the general importance of this area for walking a cycling movements across The Centre between Baldwin Street and Clare Street/Corn Street to the east and Colston Street, College Green and other attractions to the west.

There was agreement on the need to ensure good continuity and legibility of the north-south cycle track along the western edge, and also on the view that the north-south path through the middle should be shared on both sides of the new crossing. If well designed, the cycle track will carry most of the north-south cycle traffic, leaving little to use the central shared path. As to the signalised crossing facilities, the cycle track should have its own marked crossing, which could be formally separate from, or immediately adjacent to, a shared central crossing.

Concerning east-west movement, while cyclists will be able to use the new vehicular route, safer space for cycling can be provided off the carriageway. The consensus was that there is sufficient space to create conditions that will enable pedestrians and cyclists to share the same space across The Centre on acceptable terms.

The challenge, in this location, at the south end, and indeed throughout The Centre, is now to use the guidance in section 6 to get the design of shared spaces right; and to ensure their effective integration with the walking and cycling facilities with which they connect.

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