

Creating better streets: Inclusive and accessible places

Reviewing shared space



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1) Foreword

This CIHT review of shared space is the result of a great deal of work by those interested in making our streets better places for everyone.

The issues around shared space have often been controversial and the recommendations that this review has made, if put into place, will help make our streets into the safe, inclusive environments that we need them to be. We would like to express our thanks for the support of the Department for Transport, the Disabled Persons Transport Advisory Committee, the Institute of Highway Engineers, those members of CIHT who gave much of their time to develop this review and those local authorities who shared information openly for all their input. We are also grateful to all those who have shared information with the review.

The recommendations the review makes are aimed at the Government, Local Authorities and those professionals who are working to make our highways inclusive, safer and part of the public realm and the community around them. We will support the implementation of the recommendations in whatever way we can.



Andreas Markides,
President, CIHT (2017-18)



The Lord Holmes of Richmond MBE



2) Introduction

Highways are a vital part of the public realm and contribute to a prosperous economy and a healthy and inclusive society.

In recent years, inspired by government documents such as 'Manual for Streets', the need to achieve a better balance between the 'movement' (by all modes) and 'place' functions of highways has increasingly become accepted by the profession.

This balancing of the movement and place functions of our highway and transport networks is a key area for consideration by Highways and Transportation professionals and is a complex area where CIHT has worked collaboratively with government and others to develop guidance over a number of years.

Along major highways – for example, trunk roads and motorways – the movement function is usually the most important, and the needs of vehicle users generally take priority, but for large parts of the highway network, the needs of all users must be considered. Despite this, in many locations, motor vehicles have become dominant to the detriment of a wide group of users, both in terms of their ability to move around and in the quality of the place itself. This situation has sometimes resulted in streets being avoided by particular types of users, with corresponding impacts across the health and well-being spectrum.

Shared space schemes, which are designed to achieve better places where pedestrians and cyclists can move more freely, were introduced with the aim of reducing those impacts. Guidance on the topic was published by the Government in 2011, Local Transport Note 1/11 'Shared Space' (LTN 1/11)¹.

They have been popular with some people but have also attracted criticism. Parliament has responded to that criticism in various ways including, but not limited to, a House of Lords debate in 2015² and a report of the Women and Equalities Select Committee in 2017³.

This review, carried out by CIHT members, draws available evidence from a selection of schemes to frame a number of recommendations both for further work and for improvements in the way that street improvement schemes are undertaken so that authorities can achieve designs that meet the needs of all of their users.

¹ <https://www.gov.uk/government/publications/shared-space>

² <http://www.publications.parliament.uk/pa/ld201516/ldhansrd/text/151015-0003.htm#15101554000816>

³ <https://publications.parliament.uk/pa/cm201617/cmselect/cmwomeq/631/63102.htm>

In undertaking the review, CIHT has worked to the principle that street design needs to meet the requirements of all users so that inclusive environments are created. This golden thread, enshrined in the requirements of the Equality Act 2010, must flow through the entire design, construction, operation and maintenance process.

Throughout the review, CIHT has been grateful to its members who gave their time and expertise voluntarily to carry out the review and to members of the Steering Group who have provided valuable advice and support in finalising this document. Grateful thanks are also given to those local authorities who contributed by providing information to our team and gave their consent to the information collected being used in preparing this report. This review is not a critique or audit of individual schemes but rather seeks to draw conclusions from an analysis of a range of schemes to develop recommendations that will lead to better outcomes in the future.

The review has tried to cover all aspects that allow the creation of safe, inclusive places but the further work identified by the review will need to be undertaken in the context of the current security situation in the United Kingdom.

The aims of this review are to

- Set street design within the overall context of the statutory requirements on local authorities set out in the Equality Act 2010 and other legislation,
- Set a framework of clear objectives that authorities can use to provide the basis for developing designs and the monitoring of completed schemes,
- Review a range of schemes identified as shared space and draw a number of conclusions around the typical benefits and impacts of such schemes,
- Suggest a classification of different street design types that might be helpful in developing approaches to future schemes, and
- Recommend areas where further work is required by the profession and by government.



3) Overall context of street design within built environments

All of those involved in the planning, design and delivery of public realm schemes need to be aware of the requirements of the Equality Act 2010.

CIHT has pressed for clarity in a number of areas with respect to highways and the built environment, in particular, making the following general points to the Women and Equalities Select Committee in December 2016:

- Government, at all levels, should be clear that the consideration of the built environment has to include highways and transport networks and the services they deliver, as they are often viewed separately from buildings.
- There has to be better coordination across government in this regard or efforts to create places and services that are accessible to all will be diluted. It must be made clear that the built environment should be accessible for all.
- There should be a clear strategy, set nationally, for collaboration between different policy areas in making inclusive and accessible environments. The strategy must include the entire range of professional inputs so that separate commissioning bodies are clear who should be involved, how they will contribute and how accessible environments can be delivered.
- Guidance required to support this range of inputs should be refreshed or developed and used in the development and training of the people delivering services across the built environment.
- There must be a better understanding of diversity and inclusion, both in terms of the needs of all when using the built environment and by those that are delivering services to the built environment. Government should commission detailed research into the differing needs of people with physical and mental impairments.
- Improved accessibility and mobility for all should be an essential objective for all policy makers, designers and providers in the built environment.

It is important to note two key points in regard to highways and transport networks:

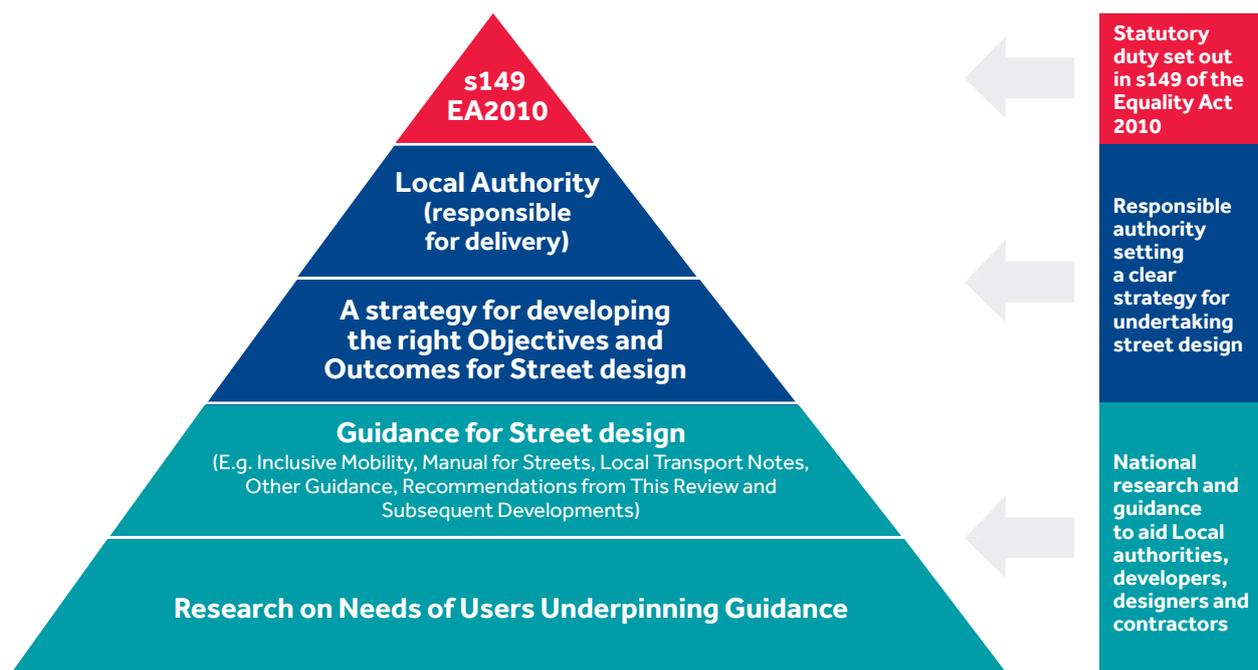
The first is that highways and transport networks are recognised as having two key functions: that of enabling the **movement** of people and goods, but they should also make a positive contribution to the **place** in which they sit. Designing for movement has often been the main focus of government and the profession, but place is of great importance when considering accessibility and inclusion.

The second is the scale of contribution that good design can make to achieving better places. Highway and transport networks, particularly in built-up areas, account for a significant proportion of the public realm and fulfil a range of vital functions alongside their movement function, including enabling access for all to local services, shops and other businesses.

The fundamental thread in design, maintenance and operation of the highways and transport network should be that the needs of all users should be considered to create an inclusive public realm.

In developing our approach to carrying out this review, CIHT considered how a strategy for creating inclusive environments when developing streets might sit within a hierarchy of legislation and guidance.

The following diagram shows how such a strategy might sit alongside other key requirements such as the Public Sector Equality Duty, as set out in Section 149 of the Equality Act 2010.





4) Setting a Framework of Objectives to Guide the Review

To give a structure to the review, the team considered a range of objectives that should normally underpin the development of street-improvement schemes.

These objectives, the outcomes they should typically lead to and the evidence of whether those outcomes had been achieved not only formed the basis of the review but also provides a useful starting point for any future guidance that may be developed.

Street redesign schemes are primarily about changing the way a street and place works. To enable that process to be carried out effectively, it is important that a framework is created that sets out a clear vision for why change is needed and a rationale for doing so that can be used throughout the process.

Setting and agreeing a number of objectives at the outset gives clarity to those developing schemes and those who use them on why the scheme is being undertaken. They provide the basis for gathering information to be used to develop the scheme and set a framework for engagement and planning, as well as a baseline for monitoring their effectiveness after they have been delivered.

The objectives are summarised in the following table, together with a range of potential outcomes that might be expected and that can be measured to assess how successful the scheme has been.

The table also highlights where specific statutory duties are required of authorities in direct relation to the objectives. The table does not list all the duties of local authorities in connection with delivering services on streets. The table reflects the position in England; statutory duties vary across different parts of the UK.

Headline Objectives	Relevant statutory duty	Potential Measurable Outcomes
Inclusive Environment	Equality Act 2010	Perception of safety, comfort & navigation (all users) Presence of Vulnerable Users (older people, children, disabled people)
Ease of Movement	Traffic management Act 2004	Levels of walking, cycling and public transport use Motor traffic congestion and/or flow Number and ease of pedestrian crossing movements Level of delay to all users Pedestrian crowding
Safety and Public Health	Road Traffic Act 1988	Motor vehicle speed Number and severity of collisions and casualties Noise levels Air quality and other public health measures Security measures Crime and fear of crime
Quality of Place		Levels of place activity (e.g. sitting, dining etc.) Space available for place activity Attractiveness (e.g. paving materials, planting, public art) Suitability of materials over lifetime of scheme Amount of useful street furniture Amount of street clutter Quality of Maintenance and Cleansing
Economic Benefit		Pedestrian footfall Number and prosperity of businesses (e.g. reduced vacancies, increased rental values etc.) Car parking occupancy Cycle parking occupancy Benefit and Cost assessment Frequency and type of special events (e.g. markets, performances)

Few of the schemes reviewed could point to a set of formal design objectives of this type. In general, schemes were largely driven by the desire to improve the quality of place and the ease of movement by pedestrians and therefore create an economic benefit to the area.

Schemes generally aimed to have no adverse impact on delays to motor traffic, road safety and inclusivity, but these were not usually the principal aims of the schemes.



5) Definition of design types

One of the difficulties in this subject is the difficulty of defining the term 'shared space'. The report of the Women and Equalities Committee⁴ noted that this is a significant barrier to discussing the issue in a meaningful way.

Local Transport Note 1/11 uses the definition:

"A street or place designed to improve pedestrian movement and comfort by reducing the dominance of motor vehicles and enabling all users to share the space rather than follow the clearly defined rules implied by more conventional designs."

Some designers have taken this definition to mean that there is a single space that is shared. While this may be true for some schemes that have been labelled shared space – for example, Leonard Circus, London Borough of Hackney – it is less applicable to other schemes such as Poynton, Cheshire, where the street is still generally divided into separate spaces that are primarily for pedestrians and vehicles.

Furthermore, LTN 1/11 makes it clear that there is no such thing as a definitive shared space design and that each scheme must be designed to meet local circumstances. One of the key decisions that will need to be taken is how much separation there should be between user groups (particularly pedestrians and vehicles) and how this should be achieved. Shared space is clearly not a 'one size fits all' concept.

Through the review, we identified three broad types of street design approach that have been (sometimes) referred to as shared space but which have a number of important differences. While these definitions should not be regarded as absolute and a particular street improvement project may contain more than one type, it is hoped that they will provide greater clarity for designers, decision makers, stakeholders and users.

It is vital that the overall context of why a redesign of a street is taking place is fully understood and predicated on inclusive design rather than simply trying to fit into one of the categories suggested. The understanding and gathering of baseline information against the objectives set out above is a key part of understanding that context and reaching the correct design proposals, around which meaningful engagement can be undertaken.

⁴<https://www.publications.parliament.uk/pa/cm201617/cmselect/cmwomeq/631/63102.htm>

It should always be borne in mind, however, that it is the detailed features that users encounter when moving through or being in a space – a bench, a kerb, tactile paving, crossings, an unmarked junction – that will determine the quality of their experience in that location. The detailed assembly of features that make up a design should always be the focus of the designer’s attention, who should not be constrained by any rigid definitions of street type.

The street design approaches which are suggested are the following:

a) Pedestrian prioritised streets

Streets where pedestrians feel that they can move freely anywhere and where drivers should feel they are a guest (e.g., Leonard Circus). Under current legislation, this does not give formal priority to pedestrians.

b) Informal streets

Streets where formal traffic controls (signs, markings and signals) are absent or reduced. There is a footway and carriageway, but the differentiation between them is typically less than in a conventional street. (e.g., Poynton)

c) Enhanced streets

Streets where the public realm has been improved and restrictions on pedestrian movement (e.g., guardrail) have been removed but conventional traffic controls largely remain (e.g., Walworth Road).

(Note: The last of these types is on the limit of what may be called shared space but has been included for completeness since the term has sometimes been applied to this type of street.)

All of these design approaches may be applied to both links and to junctions. Descriptions of the three approaches are below and these are followed by the findings of the review, the conclusions the review team drew from the findings and the recommendations the review is making based on the conclusions reached.

Pedestrian-Prioritised Streets

This type of street has been created where the aim has been to create conditions whereby drivers and riders feel they should give priority to pedestrians, and where pedestrians feel comfortable in accepting that priority. This approach is in spite of the fact that UK legislation does not give priority to pedestrians over vehicular traffic except in certain circumstances when using formal crossings.



Such pedestrian-prioritised streets have been adopted where traffic volumes and speeds are low and designers have sought to achieve these outcomes through the design. Pedestrian volumes in the schemes considered have been relatively high; and this is consistent with research⁵ carried out for LTN 1/11 which showed that more pedestrians occupying street space resulted in a reduction in traffic speed. In general, schemes of this type can achieve very low traffic speed, typically well below 20 mph.

The review did not consider what absolute values should define 'low traffic volumes', although Manual for Streets⁶ notes that people will treat a street as a space to be occupied and not a road to be crossed when traffic flows are not more than about 100 vehicles per hour. This is based on research carried out by TRL⁷. A similar value is used for the application of the Dutch 'Woonerf' (Home Zone).

In some cases, this design approach has been used where the only motor traffic using a street is for local access so that volumes are very low (e.g., Southgate Street in Gloucester).

The designs of pedestrian-prioritised streets have meant that they are useable by cyclists without requiring any dedicated facilities. Again, the review has been mindful of research carried out by TRL which showed that conflicts between pedestrians and cyclists in fully pedestrianised streets are rare, with cyclists slowing and eventually dismounting as pedestrian volumes increase⁸.

Street schemes of this type have generally adopted designs that do not appear to contain a well-defined carriageway so that road users (particularly drivers) do not assume that pedestrians need a defined crossing or a driver's permission to cross the street. Such schemes have often used a level surface, sometimes with similar paving types and colours across the whole of the space.

Wayfinding can be a problem for several user groups, including young children, older people, non-locals and visually impaired people in this type of street. Some schemes (e.g., Kimbrose Triangle, Gloucester) have used guidance paving, but this is not without its difficulties. For many people, the building line is the best form of guidance.

Seating and other useful street furniture has often been placed in the street to emphasise its primary function as a place to be enjoyed, but this can also create obstacles for visually impaired people where it has not been located carefully.

It is perhaps worthy of note that several European countries have streets with priority for pedestrians (sometimes referred to as 'encounter zones')⁹ whereby pedestrians enjoy priority over vehicles anywhere in the space, underpinned by legislation. The review considers this further in our conclusions and recommendations.

⁵ MVA Consultancy (2009) Stage 1: Appraisal of Shared Space. DfT

⁶ Research on shared space streets – Manual for Streets Page 83

⁷ Research on shared space streets – Manual for Streets Page 83

⁸ TRL Report 583 – Cycling in vehicle restricted areas

⁹ Zones de Rencontre or Begegnungszonen – see https://fr.wikipedia.org/wiki/Zone_de_rencontre

Informal Streets

This design approach has been used with the overall aim of creating a street where the higher volume of traffic does not dominate non-vehicular users. Informal streets have been used where traffic flows are much higher than pedestrian-prioritised streets; schemes such as Poynton carry an excess of 25,000 vehicles per day, including buses and HGVs.

Informal streets have a defined carriageway for vehicles and a defining feature of this design approach is the absence or reduction of formal traffic control measures, particularly at junctions. The aim was to reduce the speed of vehicles by creating some uncertainty in drivers' minds over whether they have the right of way. Other design features were used with the intention of reducing vehicular speed and dominance such as reducing the differentiation between the footway and carriageway, for example, by using reduced-height kerbs; and providing features such as median strips which encourage more frequent crossing movements by pedestrians.

Because of the higher traffic flows, most schemes of this type have provided regular crossings of the carriageway where drivers stop or slow to allow pedestrians to cross with confidence, either through formal crossings (signalised or zebra crossings) or by design (courtesy crossings). Courtesy crossings, which do not use traffic signals, signs or markings, have been used to reduce the formality of the street, but formal crossings have also been used. Some schemes have a combination of both types. Some schemes have also provided crossing opportunities where pedestrians can cross during gaps in the flow of traffic.

Tactile paving has been used to indicate courtesy crossing points. Whilst some authorities have developed bespoke types, most have used tactile paving in accordance with national guidance.

None of the informal street schemes included any dedicated cycle infrastructure, but the review considered that there is no in-principle reason why such facilities could not be provided.

Enhanced Streets

As noted above, this design approach has been included for completeness, but it is very much on the limit of what might be called shared space.

The enhanced streets considered in this review are essentially conventional streets where care has been taken to improve the quality of the place. This has typically been achieved through the removal of unnecessary street clutter, particularly pedestrian guardrails which reduce people's freedom of movement, and by the introduction of features such as seating, public art and street trees, which improve their experience of simply being there.

These enhanced streets have typically retained conventional traffic-engineering features, such as junctions controlled by traffic signals and give-way markings, as well as controlled crossings, although courtesy and gap crossings have also been used on some schemes.



6) Details of the review

The Department for Transport contacted highway authorities in England in autumn 2015 to ask for details of any shared-space schemes they had undertaken.

Based on the resources available for this review, twelve schemes were selected, which covered the three types of design approach outlined previously.

CIHT contacted these authorities to ask for their agreement to take part in the review and provide any information they held on the design and operation of the schemes. The review considered information provided by the authorities in response to that request, information gathered by the review team during site visits and information subsequently provided by the authorities to the review team. Only very limited additional surveys, relating to courtesy levels at crossings, were carried out as part of the review.

Details of the review were shared with the authorities, and eleven gave consent for the information to be included in this report. The twelfth withdrew their consent based on issues outside the scope of the review. The details of the reviews are presented in Appendix A, and a summary of the results is provided below.

A number of the authorities attended a workshop to discuss the findings from the review, which helped form the conclusions and recommendations.

7) Summary of findings

The review examined eleven schemes at various locations throughout England. These were categorised into the three separate types: Pedestrian Prioritised Streets, Informal Streets and Enhanced Streets.

The effectiveness of the treatments at each location was assessed against criteria which were considered to be related to the typical overarching objectives for such schemes. These were:

- inclusive environment,
- ease of movement,
- safety and public health,
- quality of place and
- economic benefit.

Although not available in all cases, the views of promoters, designers and users of the schemes were considered as part of the assessment process.

Assessments against each of the objectives were attributed as being either Positive, Neutral or Negative or were described as Insufficient Information, where it was considered very little or no objective data was available. Where the range of information was wide and contained differing evidence, more than one description was used. Where this was the case, an explanation is given in the Appendix.

The results of the assessments are indicated on the following matrix.



	PEDESTRIAN PRIORITISED STREETS			
	Ashford	Exhibition Rd	Holbein Place	Leonard Circus
Inclusive Environment	Neutral	Neutral	Neutral	Neutral
	Insufficient Information	Insufficient Information	Insufficient Information	Insufficient Information
Ease of Movement	Neutral	Positive	Positive	Positive
Safety and Public health	Neutral	Positive	Neutral	Neutral
Quality of Place	Positive	Positive	Positive	Positive
Economic Benefit	Positive	Neutral	Insufficient Information	Neutral
		Insufficient Information		Insufficient Information

	INFORMAL STREETS				
	Poynton	Coventry Gosford St	Gloucester Kimbrose Triangle	Preston Fishergate	Hamilton Road Felixstowe
Inclusive Environment	Insufficient Information	Positive	Positive	Positive	Insufficient Information
		Negative	Negative	Negative	
Ease of Movement	Positive	Positive	Positive	Positive	Positive
Safety and Public health	Neutral	Positive	Neutral	Insufficient Information	Neutral
Quality of Place	Positive	Positive	Positive	Positive	Positive
Economic Benefit	Positive	Positive	Insufficient Information	Insufficient Information	Positive

	ENHANCED STREET	
	Walworth Rd	Borehamwood High St
Inclusive Environment	Positive	Insufficient Information
	Insufficient Information	
Ease of Movement	Positive	Positive
Safety and Public health	Positive	Positive
Quality of Place	Positive	Positive
Economic Benefit	Insufficient Information	Positive

There are a number of conclusions that can be drawn from the summary matrix which are noted below;

In terms of creating an **Inclusive Environment**, some schemes had attracted significant criticism from some groups of users. In the majority of schemes, there was insufficient objective evidence to show whether there had been any adverse or positive effects. Where there was any evidence available, some schemes could point to positive improvements, some were negative, while in others, the evidence was not available. Moreover, the effects appeared to vary between different user groups. For some user groups such as wheelchair users and older people, there was evidence that particular features of certain schemes had improved their experience. However, some visually impaired users were reported as finding the new environments more hostile and consequently said that they altered their behaviour to avoid them. Only one case study had included creating an inclusive environment as an objective in the development of the scheme.

In terms of **Ease of Movement**, the overall conclusion from the evidence available was that the schemes had led to an improvement in this objective, although, as outlined above, evidence on the impact of schemes on pedestrians with different needs was insufficient in the majority of schemes. Ease of movement was considered for all modes of transport. In general, subject to the exceptions identified above, the evidence showed considerable improvement in pedestrian connectivity and movement, with more space for walking and reduced delays in crossing the street. Improving accessibility and reduced congestion for motor traffic was generally not an objective of the schemes; however, in the majority of cases, congestion was reduced. Little information on cycling was available.

The effects of the schemes on **Safety** was easier to assess, based on official road traffic collision data. Four schemes demonstrated positive evidence that the number of accidents and casualties had improved when compared with the previous situation. In six others, the review found that the schemes had been neutral in this regard and one scheme had insufficient information to fully compare against the previous situation.

Where possible data was analysed over a similar period before and after the scheme's implementation but the availability of data was not consistent across the sites. Although the case is sometimes made that any improvement to road safety comes as a result of vulnerable people avoiding the completed scheme, we could find no objective evidence to assess the scale of this and whether it is large enough to have an effect.

It is also sometimes said that the inevitable under-reporting of accidents and near misses means that these official statistics cannot be relied upon, but since any under-reporting would also apply to the 'before' situation, we consider that this data provides a valid way of assessing the impact of the schemes. This under-reporting is not limited to shared space but applies across all types of highway scheme.



In terms of **Public Health** impacts of the schemes, the evidence was very limited, and no conclusions could be drawn which would affect the assessment based on safety. Any reduction in stop/start driving is likely to have some air quality benefits.

In terms of **Quality of Place**, all the schemes led to an improvement in quality when compared with what was there previously. Whilst this was not surprising, given the general aim of this type of scheme and the level of investment carried out, it is nevertheless worth noting.

In terms of **Economic Benefit**, the overall view presented was that the impact was broadly positive. There was no evidence of an overall, consistent approach to setting out the benefits of the schemes in both qualitative and quantitative ways, nor in defining the whole life costs of the schemes.

8) Conclusions

We have drawn the following conclusions from our review:

1 - General Principles

Conclusion 1.1

On the evidence available, it is considered that whilst the schemes work well for the majority of their users and the place that they are serving, it is clear that some users consider that the current designs, especially Informal Streets, need to be improved. Key issues are around the use of kerbs and controlled crossings. An inclusive approach to the design of these schemes is required.

Conclusion 1.2

The review team felt strongly that future schemes seeking to improve the public realm through better street design need be promoted, designed, implemented and monitored against a series of predefined objectives with clear outcomes that can be measured in a consistent way. This will better enable inclusive environments to be created that meet all the needs set out in these objectives.

The review team considered that there were five key areas that should be included:

- inclusive environment,
- ease of movement,
- safety and public health,
- quality of place and
- economic benefit.

Conclusion 1.3

A number of conclusions can be drawn when considering how the schemes perform against the five objectives identified above. On analysis of the evidence available, the majority of schemes appear to have created positive improvements against the objectives relating to **Ease of Movement** and **Quality of Place**, which appears consistent with many schemes having these objectives.

In terms of **Inclusive Environment** the majority of schemes could not be fully assessed due to insufficient information. However, we are well aware that some user groups, including but not limited to, visually impaired people, have significant concerns. This does indicate that some user needs have not been met in some schemes, including in the consultation and engagement carried out, and this appears consistent with this objective not being identified as a specific aim for the majority of schemes.



In terms of **Safety**, over half the schemes were neutral, meaning overall accident data is broadly unchanged or statistically insignificant. In a number of schemes the situation appears to have improved when compared with the period before the scheme was implemented and in one case there is insufficient evidence to judge. No scheme has resulted in a significant increase in the number of recorded collisions. In general terms, the availability of information relating to **Public Health** is limited.

In terms of **Economic Benefit**, five of the schemes have drawn evidence of positive improvements, the remainder have insufficient information available or are neutral. As outlined above there is no consistent approach to identifying the whole life cost of schemes and the identification of benefits in a way that allows direct comparison across the schemes.

Conclusion 1.4

On the basis of Conclusion 1.3 it is clear that further guidance is required to help local authorities and scheme designers define outcomes related to each of the five objectives set out above in more detail and to develop appropriate ways of measuring them. This is particularly the case for inclusive environments, where the effect of schemes has been rarely assessed.

Conclusion 1.5

The review team, the steering group and many of the officers from local authorities whose schemes were included in the review found the term 'shared space' to be unhelpful, as it is vague and tends to be associated with several preconceived ideas. Moreover, it could be said that all highways are, by definition, shared between different groups since in law, no type of user has priority.

We therefore propose three new design approaches to replace shared space:

- Pedestrian-Prioritised Street
- Informal Street
- Enhanced Street

We believe that these more clearly describe typical design approaches that can be applied in different situations. These should not be regarded as absolutes, however, and designers should always remember that it is details that matter to users, rather than any description used by the design team.



Conclusion 1.6

We see a case for developing guidance, based on further research, which enables designers to decide which type of street is likely to be most appropriate in any given situation. This would need to consider factors such as the number of pedestrians, traffic flow and speed, but should also take into account the five overarching objectives we have identified for carry-ing out streetscape improvements, as well as the local context.

The most significant decision required is when to move from the pedestrian-prioritised street type, where the driver should be seen as a guest, into the informal street type, where pedestrians will need to cross a defined carriageway. The differences between the informal and enhanced street are largely to do with the extent to which conventional traffic control measures are needed.

Conclusion 1.7

A key conclusion of the review is that great care needs to be taken when using features or techniques appropriate for one type of scheme when the overall characteristics of the location clearly require a different design response. For example, while it may usually be appropriate to omit defined crossings in a pedestrian-prioritised street, doing so when traffic flows are much higher can make it much more difficult for some people to cross the street.

Conclusion 1.8

Although Local Transport Note 1/11 does place particular emphasis on the need for stakeholder engagement, there are concerns that design teams have sometimes not given sufficient weight to this advice.

Conclusion 1.9

Although there is some evidence that pedestrian prioritisation can be achieved through careful design, it is considered that adopting legislation in the UK that is similar to that underpinning successful Encounter Zones used in several other countries would make it much easier to introduce pedestrian-prioritised streets and create an inclusive and accessible public realm.



2 - Details

The different design features that were used in the various schemes were considered by the review team to see if any conclusions could be drawn that would assist scheme designers. The various design features are set out below, including where further research is necessary.

Conclusion 2.1 – Crossings

Regardless of the type(s) of crossing, in Informal and Enhanced Streets, there should be sufficient provision for all users to cross the carriageway safely and in comfort.

Crossings where drivers are encouraged through the design to give way to pedestrians (courtesy crossings) have been used on a number of the schemes reviewed. Courtesy crossings fit well with the aim of encouraging road users, particularly drivers, to engage with their surroundings rather than simply following traffic rules, which tends to reduce traffic speed. There is a need for more research in this area.

At some courtesy crossings, a high proportion of drivers have been observed to give way to pedestrians whereas others have been less successful. The use of speed reduction measures, conspicuous treatments, locating crossings on junction entries and exits, changes in level and median strips all appear to encourage greater driver courtesy. Further research into the relationship between these and other design features and driver courtesy is needed. This research should also identify whether and to what extent the willingness of drivers to give way depends on the characteristics of the person(s) wishing to cross.

Some schemes have included controlled crossings as well as courtesy crossings, and this could represent a balanced approach, but there is some limited evidence from the case studies that this may lead to fewer drivers giving way at the courtesy crossings. Further research into when and how crossing types may be combined should be carried out. The legal position of people using courtesy crossings needs to be clarified.

It was noted that an area beyond the scheme itself will often need to be considered to understand pedestrian movements in the wider context. This may identify a need to provide appropriate crossing facilities beyond the main works.

Conclusion 2.2 – Kerbs

Whilst the review team did not specifically gather data relating to kerb heights, we consider that where conditions are such that the street needs to be separated into a carriageway and footway, the interface between them should be clearly delineated and detectable by all. In most situations, a kerb will be the most appropriate and simple way of achieving this, although at crossings and potentially in other areas (e.g., tabled junctions), using tactile paving will be necessary (see below).

In this context, we are aware that research carried out for LTN 1/11¹⁰ indicates that drivers respond by slowing down when the degree of separation between pedestrians and vehicles is reduced. Designers therefore often use a kerb height well below the 120 mm that is typically used in urban streets. We are also aware of research¹¹ that found that kerb heights of 60 mm and above were detectable and induced the greatest confidence in visually impaired people and that heights of less than 40 mm were less detectable and should be avoided if possible. Given the practicalities of construction, a kerb height of between 50 mm and 60 mm would appear to be suitable, but further research on this topic in the field is needed to inform this key design decision.

Conclusion 2.3 – Tactile Paving

Tactile paving provides vital information to visually impaired people to enable them to move around independently. However, although it has been in use for many years, there are still practical difficulties in the application of government guidance, which can result in inconsistent designs in some situations common to shared-space-type schemes.

An example of this is where there is an extended level surface within which there are defined crossing points. This raises the question of whether blister tactile paving should be used throughout the level surface or only at the crossing points.

Wayfinding is a potential problem in pedestrian-prioritised streets. Some schemes have used guidance paving as a solution, but this type of tactile paving is not universally liked by users. Guard railing has understandably been removed from schemes to enable pedestrians to move freely, but this can be a useful wayfinding feature for visually impaired people, and consideration needs to be given how this function can be retained.

Conclusion 2.4 – Technology

Although not specifically addressed amongst the assessment criteria used for the review, we noted that some authorities were investigating the possible use of technology to enable visually impaired and other disabled people to use streets where conventional traffic engineering facilities had been reduced or removed. Examples included signal-controlled crossings that could also be activated by people possessing a key or code and smartphone apps that detect approaching vehicles and alert users using vibration, sound and/or bright colours.

We conclude that this is a promising area for further government research.

¹⁰ MVA Consultancy 2010

¹¹ Childs CR, Boampong DK, Rostron H, Morgan K, Eccleshall T, Tyler N (2009) Effective Kerb Heights for Blind and Partially Sighted People



9) Recommendations for further work

Recommendation 1

As part of its wider work on accessibility, the government makes clear the duties of local authorities with regard to the Equality Act 2010 and other legislation with respect to the improvement of the public realm.

Recommendation 2

That the government recommends to local authorities that the framework of objectives used to carry out this review be used when developing public realm improvements to provide clarity into why these schemes are being carried out and inform design choices.

Recommendation 3

It should be made clear that appropriate outcomes should be set during the design and implementation phases of schemes and used to monitor their effectiveness once the schemes are complete. If necessary, authorities should carry out amendments in the light of these assessments, having regard to their statutory duties. The government and the sector should undertake work to develop the detail of the framework and outcomes and how they are measured.

Recommendation 4

Education and continuing professional development of those developing works in the public realm should specifically include the requirements around creating inclusive environments and accessibility. Professional institutions across the sector should take a lead in developing this approach.

Recommendation 5

Government should make it clear that stakeholder engagement is an essential part of the process, by reference to guidance in the sector.

Recommendation 6

That the government, local authorities and the sector should stop using the term shared space to describe an approach to street design. Instead they should start using the three types of approach suggested by this review namely: pedestrian prioritised streets, informal streets and enhanced streets.

Recommendation 7

The government should undertake research into the factors used to differentiate between the design approaches suggested in Conclusion 1.5 and develop guidance to assist their implementation by local authorities.

Recommendation 8

Government should move forward with its work on inclusive mobility and undertake research into the needs of people using the public realm, including how their needs differ due to visual impairment and other disabilities.

Recommendation 9

Government should review the potential to introduce legislation to enable local authorities to establish streets where pedestrians have priority, based on the successful Encounter Zones that are used in several other countries.

Recommendation 10

Government should undertake research into courtesy crossings, focusing on the relationship between various design features, context, user types, levels of driver courtesy and their relationship with formal crossings.

Recommendation 11

Government should clarify the legal position of users of courtesy crossings.

Recommendation 12

Government should review existing research on the most appropriate kerb height in actual street situations, considering factors such as detectability by visually impaired people and the effect of reduced kerb heights on traffic speed and over-running.

Recommendation 13

The government should review and update existing relevant highway and public-realm design guidance in order that a consistent approach is taken to the improvement of streets based upon the findings of this review. To facilitate the review all of the research identified in the recommendations of this review should be considered.

Recommendation 14

Government should give priority to the production of updated guidance on tactile paving to address the practical difficulties faced by designers when creating streetscape improvements that meet the needs of visually impaired people. This should expressly consider the best means of identifying defined crossing points and enabling people to find their way, particularly within level-surface streets.

Recommendation 15

Government should work with local authorities and technology companies to investigate the potential for new technology to assist in the creation of Inclusive environments.



10) Appendix

1. Elwick Square, Ashford
2. Exhibition road, Royal Borough of Kensington and Chelsea
3. Holbein Place, Royal Borough of Kensington and Chelsea
4. Leonard Circus, London Borough of Hackney
5. Fountain Place, Poynton, Cheshire
6. Gosford Street, Coventry
7. Kimbrose Triangle, Gloucester
8. Fishergate, Preston, Lancashire
9. Hamilton Road, Felixstowe, Suffolk
10. Walworth Road, London Borough of Southwark
11. Borehamwood, Hertfordshire

Unless otherwise stated all information contained in the case studies that follow has been provided to the review team by the relevant local authority.

Unless stated otherwise information on reported accidents has been collected from the website Crashmap.co.uk

Unless stated otherwise photographs have been provided by the review team or provided to the review team by the relevant local authority.

Case Study 1: Elwick Square, Ashford

Pedestrian Prioritised, Junction

1. Introduction

The redevelopment of Elwick Square in Ashford was part of a wider economic regeneration scheme aiming to expand the town centre. The existing County Square shopping centre played a major role in this programme and underwent significant expansion. The town centre had previously been constrained by the ring road which separated the town from the train station. The former busy dual carriageway has been redesigned using shared-space principals. This case study will focus only on Elwick Square rather than the entire ring road.

The previous traffic signals, guard railing, signing and road markings have been removed. The area has been widened, and a level surface has been introduced, with consistent paving material used throughout. Courtesy crossings are included within this scheme. However, there is little colour contrast between these and the materials used in the carriageway. Hence, they are less obvious to drivers approaching at speed.



Figure 1: The County Square shopping centre on the edge of the shared space scheme in Ashford, Kent



Aims

- To reduce the number of road collisions in this area
- To reduce vehicle dominance through the town centre
- To facilitate outward expansion of the town centre and support economic growth
- To create a vibrant town centre with high quality urban design
- To create a more well-connected area and better pedestrian experiences

Image Before





Images After



First image courtesy of Google Street view



2. Technical Data

Dates	Construction began on Elwick Square in 2007. The old ring road was made two-way for the Tour de France in 2007. The scheme was opened to the public in 2008 with final landscaping completed in 2009
Cost	~£9million
Traffic Volumes	Approximately 750 motor vehicles pass through this shared-space scheme every hour
Traffic Speed	Average speed has decreased from a range of 20.4–22.9 mph to 19.6–22.3 mph
Pedestrian Volumes	Approximately 280 pedestrian movements per hour
Pedestrian Crossing Movements	Approximately 180 crossing movements per hour with a 35% courtesy rate
Road Safety	No significant change

3. Evaluation

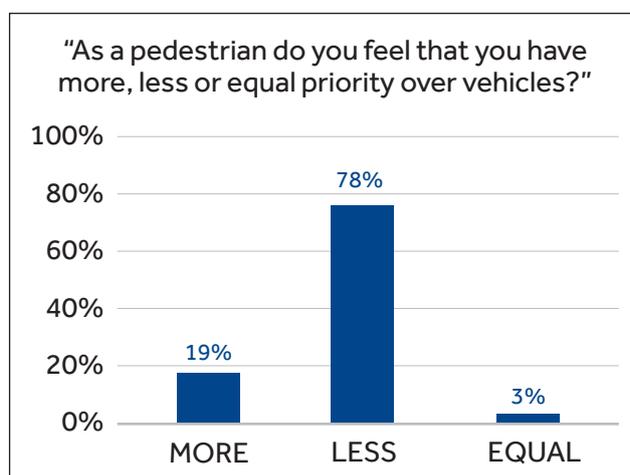
Inclusive Environments

Consultation was undertaken throughout the scheme design and construction with those representing disabled groups. A particular concern was raised over the continuous level surface and lack of kerb at Elwick Square and some other points within the wider scheme area. A post-completion workshop was also held with vulnerable user groups.

Ease of Movement

This scheme has created a wide and open square. The expansive nature of this area is exacerbated by a large vacant plot in the southern corner of the square. Wider roads encourage drivers to travel at higher speeds as there are no immediate obstacles or bends to manoeuvre. This makes crossing the road more difficult for pedestrians as there is a larger distance to navigate, and pedestrians are less willing to interact with fast-travelling vehicles because of perceived high risk of collision, injury or fatality. There are plans to develop this plot as another retail area.

Approximately 750 vehicles pass through this scheme per hour, compared with only 280 pedestrians. This scheme has shown low levels of courteous driving with a 35% level observed in 2015 by Crowd Dynamics. This is echoed in the survey responses concerning priority, outlined in the graph below.





The number of crossing movements in this space is relatively low with 48 pedestrians observed crossing the road per hour. There is a pelican crossing 150 m south of the shared space at Elwick Square, which may be used by pedestrians who are particularly worried about crossing in the square. The majority of the 144 survey participants preferred formal crossing points.

Anecdotal evidence suggests that congestion has been significantly reduced since the implementation of the scheme.

Improved Safety and Public Health

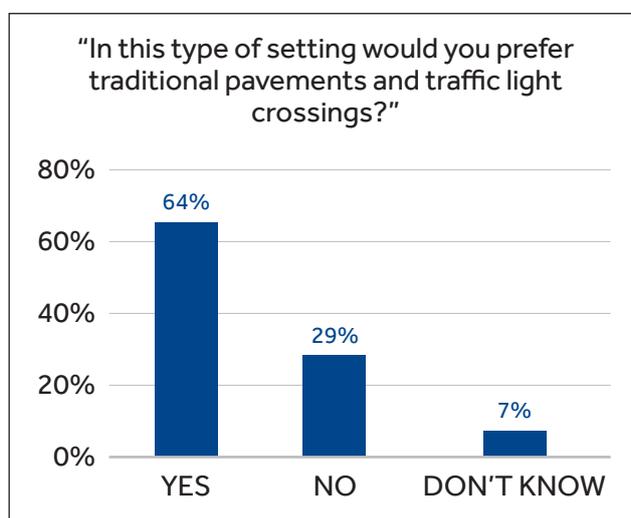
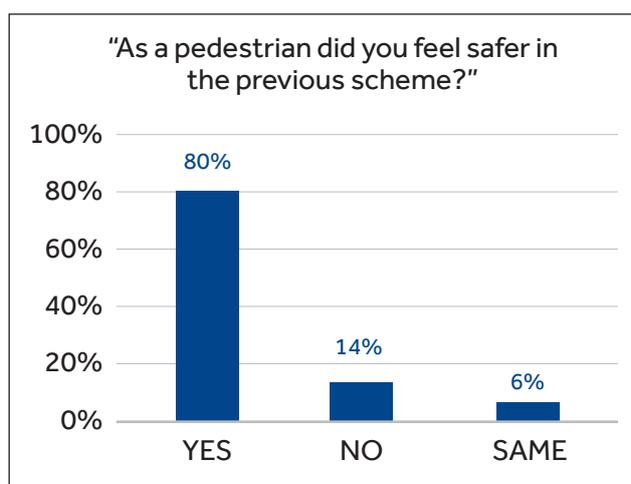
There has been a limited amount of traffic monitoring in the post-implementation phase of this scheme. The data for traffic speed before implementation of the scheme indicate relatively low speed, averaging between 20.4 and 22.9 mph. Monitoring in 2011 recorded an average speed between 19.6 and 22.3 mph.

The average motor vehicle speed over the entire scheme, not just the Elwick Square section, is now 21.5 mph, which is a significant reduction from the previous average of 40 mph.

From attitudinal surveys of users of the space in 2014, there were generally negative perceptions of safety with 80% of the people surveyed feeling safer in the previous road layout. However, no evidence has indicated that pedestrians are avoiding this area.

Based on information from the website crashmap.co.uk, the number or severity of collisions at Elwick Square in the period after implementation has not changed, compared with the period before construction. Two 'slight' accidents were recorded at this location for both periods. A reduction in pedestrian casualties and an increase in pedal cyclist casualties are seen. The rise in cycle accidents may be attributed to a general increase in cycling in the area; it would be helpful to collect cycle counts to assess this.

Kent County Council has recorded an overall decrease in collision in the surrounding area to Elwick Square since the implementation of the shared-space scheme. The maps below detail the accidents at Elwick Square during the years 2005–2006 and 2008–2009.



Key for crashmap information:



All casualty Types:

Before construction (2005-2006)



After completion (2008-2009)



Pedestrian Casualties:

Before construction (2005-2006)



After completion (2008-2009)



Pedal Cyclist Casualties:

Before construction (2005-2006)



After completion (2008-2009)





Quality of Place

The combination of the retail development and the inclusion of useful street furniture have increased the levels of place activity in Elwick Square. Bespoke street lighting and benches have been included as well as trees and vegetation, which act as sustainable urban drainage systems (SUDS). Elwick Square now represents a part of the town centre rather than a section of a dual carriageway.

The entire scheme stretches for 1 km, compared with the 2.1 km occupied by the previous ring road. This is a long area composed of granite setts at a level surface throughout much of the scheme. A significant reduction in the amount of street clutter is present within this area; the scheme now represents a much wider and clearer area with a continuous level surface and informal courtesy crossings. Stripes of different shades of stones in the carriageway mark the crossing points. However, visual contrast lacks in these stripes. The indicated crossing points provide the tactile paving at the edge of the footway. A line of steel bollards on the side next to the shopping centre marks the boundary between the footway and carriageway.



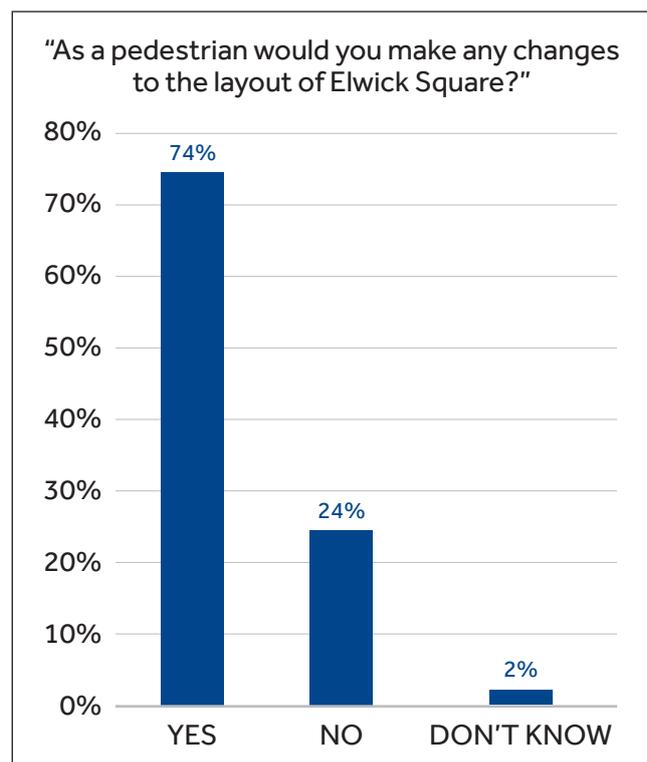
Figure 2: Plan of Elwick Square shared space design. The County Square shopping centre sits in the top left corner

In 2014, Moody and Melia carried out surveys with 144 pedestrians in the shared space at Elwick Square. The responses were largely negative, and the results are detailed throughout this section. The graph below demonstrates that the majority of participants were not happy with the current road layout.

Some materials used in the shared space were criticised for their cost, source and/or appropriateness. Some maintenance issues arose particularly around oil stains and fume damage.

Economic Benefits

The main hub of business activity in the area is the County Square shopping centre in Elwick Square, which is home to 60 retail stores with Debenhams as the anchor tenant. This shopping centre has been in place since 2007 as part of the economic regeneration of Ashford town centre. The shopping centre in 2010 was extended, which has created increased interest.





The planned further development of Elwick Square will include cycle parking provisions. Currently, some cycle parking lots – by the County Square shopping centre and Ashford train station – are available, but they are limited. The County Square shopping centre provides over 600 car parking spaces across four levels; car parking costs approximately £2 per hour.

In the early phase of the project, the DfT highlighted some issues regarding car-parking signing. These problems have since been addressed.

4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Insufficient information	Neutral
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No factual data is available on the use of the street by people with disabilities, although considerable research and scrutiny has not shown that any particular pedestrian groups are avoiding the shared space. Mobility-impaired people will have benefited from the regular level crossing points, but the street's usability by the visually impaired is not known.

Ease of Movement

Neutral

This shared-space scheme is relatively wide, and it appears even wider because of the vacant plot to the south of the square. Wider roads encourage a perception of faster speed. Pedestrians appeared less willing to interact with vehicles because of the perceived risk of collision. The courtesy crossings in this scheme are situated on the periphery of the square, which means that most pedestrians extend their route through the square to cross over the road. Anecdotal evidence suggests that congestion has been significantly reduced since the implementation of the scheme.

Improved Safety and Public Health

Neutral

Based on information from the website crashmap.co.uk, the number or severity of collisions at Elwick Square in the period after implementation has not changed, compared with the period before construction. Two 'slight' accidents were recorded at this location for both periods. A reduction in pedestrian casualties and an increase in pedal cyclist casualties are seen.

Quality of Place

+ve

Elwick Square has been successful in creating a more attractive area of public realm with useful street furniture. This area of Ashford town centre now represents an important leisure and business area as well as a vital interchange.

Economic Benefits

+ve

A major success of the scheme was the economic benefits felt through the County Square shopping centre. It acts as the main hub of retail and business activities in Ashford and acts as a significant 'pull factor' to people visiting the town.



Case Study 2: Exhibition Road, Royal Borough of Kensington and Chelsea

Pedestrian Prioritised Street, Link

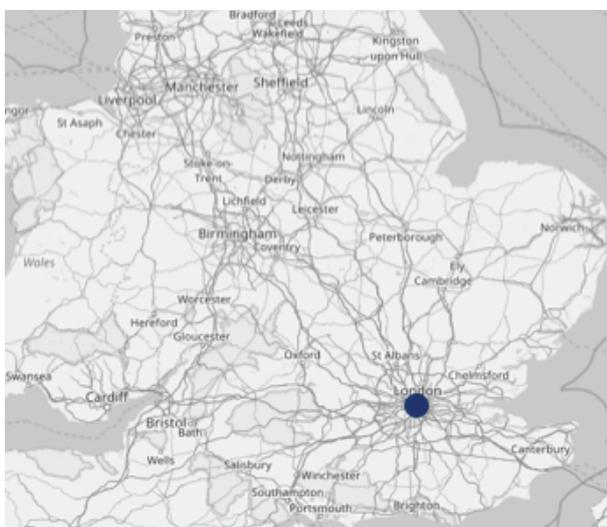
1. Introduction

Exhibition Road runs northwards from South Kensington Station to Hyde Park. It is a popular destination for tourists, attracting 11 million visitors per year because it contains attractions and institutions that are of international, historical, cultural and educational importance.

The previous road layout was a traditionally engineered design that facilitated the movement of traffic rather than pedestrians. It created severance because of the wide carriageway, dominance of parking and extensive use of guardrailing. The footways were not wide enough to accommodate the high footfall or the large groups of pedestrians that congregate outside the attractions.

The street was 'cluttered and confusing', particularly for visitors (Transport for London, 2006), and its status as a place was undervalued.

The transformation of Exhibition Road was a large-scale project costing nearly £30 million and taking two years to complete, finishing in December 2011.



Scheme location in England



Scheme location in London



One of the main aims was to improve pedestrian experience and allow a greater freedom of movement. The design incorporates a kerb-free, single surface design with wide pedestrian areas, which are free of street clutter.

The road has a distinctive chequered granite surface that covers the full width from building to building. A tactile delineator strip at the edge of the comfort spaces helps blind and partially sighted people navigate the street.

The majority of Exhibition Road is now covered by a 20 mph speed limit and apart from at the signalised junctions, it has no controlled crossing points. Tall lighting masts run along the centre of the street.



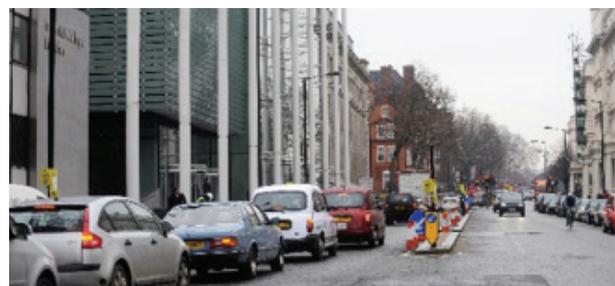
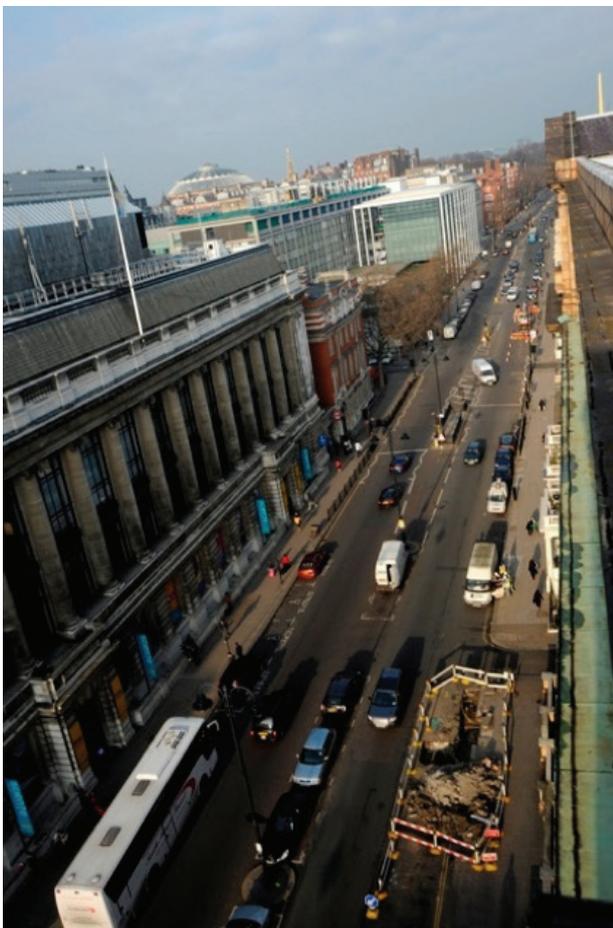
Exhibition Road transformed – view north towards Hyde Park

Aims of the scheme

- To improve access for all members of the community
- To reduce motor vehicle speed
- To create an accessible, world-class, cultural destination
- To create more flexible modes of movement



Image Before





Images After





2. Technical Data¹

Dates	Construction began in February 2010 and was completed in December 2011
Cost	£29 million
Traffic Volumes	Peak hour flows have reduced on all sections of the street. Approximately 9% north of Prince Consort Road, 24% in the section south to Cromwell Road and 11% south to Thurloe Place have been reduced. South of Thurloe Place, because of new access restrictions, has only 7% of the previous volume of traffic
Traffic Speed	Averaged across the day, the 85th percentile speed ranges from 22 to 26 mph north of Cromwell Road (20 mph limit applies) and 14–18mph south of Cromwell Road (30 mph limit applies)
Pedestrian Volumes	Footfall along Exhibition Road ranges from 6,400 to 8,200 pedestrians per day in the sections between Prince Consort Road and South Kensington tube station, peaking at 3,300 pedestrians per hour. In the section between Hyde Park and Prince Consort Road, there are 1,750 pedestrians per day
Pedestrian Crossing Movements	The busiest section of the road during the evening peak hour is close to South Kensington tube, with up to 1,800 crossing movements per hour, followed by the area by Imperial College with 800 pedestrians crossing per hour. In the other sections, there are around 200–400 pedestrian crossing movements per hour
Road Safety	Comparing the three years before the construction of the scheme began (2007–2009) with the first three years after implementation (November 2011–October 2014), collisions (of all severity) were reduced from 37 to 31

¹All data is from taken from phase 4 of the Monitoring Report, <https://www.rbkc.gov.uk/exhibitionroad/welcome-to-exhibition-road>, November 2013



3. Evaluation

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic Benefits

Inclusive Environment

Pressure from disability campaigners and a critical road safety audit prompted RB Kensington and Chelsea to drop plans for a fully shared surface on Exhibition Road.

Instead, the street would be split up into four zones, which includes the comfort spaces for pedestrians. An 800 mm strip of corduroy tactile paving delineated these zones. Alongside this is a black drainage channel, which provides colour contrast.

Guide Dogs for the Blind took RB Kensington and Chelsea to a judicial review over the scheme, fearing that the lack of a kerb was not safe for visually impaired people. The two parties agreed to conduct on-street trials with visually and mobility impaired people to test whether the corduroy paving could be detected by visually impaired people and was overpassable by people with mobility impairment. The trials were successful, and as a result, the judicial review was dropped.



Corduroy paving and drainage channel

A thorough six-month monitoring review was undertaken of road user behaviour for two years after the scheme was completed. Every six months, the results were presented to the Exhibition Road access group, which consisted of representatives from different disability groups.

The council commissioned a tactile map that is designed to help blind and partially sighted people navigate their way around the Exhibition Road area and to raise awareness of the kerbless environment. The map is located outside South Kensington tube station. Officers worked closely with the Royal National Institute for the Blind throughout its design. The map combines layers of etched zinc, bold colours, raised lettering and Braille. To complement the map, an audio guide is created in partnership with the Guide Dogs for the Blind, available on the council's website, which can be used by people walking along Exhibition Road.



There is no available information regarding how well visually impaired users can navigate the street.

Ease of Movement – Vehicle Movement

Sections A to C are two-way with one lane in either direction. Section D is southbound only, and Section E is a cul-de-sac. Hence, the traffic flow in these two sections are much less than with the old layout. This is one of the several access restrictions that were introduced as part of the scheme; the others are banned turning movements. These may have contributed to the traffic flow reductions reported in the technical data section.

The council undertook extensive and regular monitoring after the scheme was implemented to observe the behaviour of pedestrians, cyclists and motor vehicles. Some drivers did not understand that certain movements were prohibited and that access into the comfort space was not permitted. As a result, a number of bollards, signs and road markings were introduced to aid understanding. In addition, a traffic island was installed at the junction of Cromwell Road to reduce the incidence of traffic turning left into Exhibition Road.

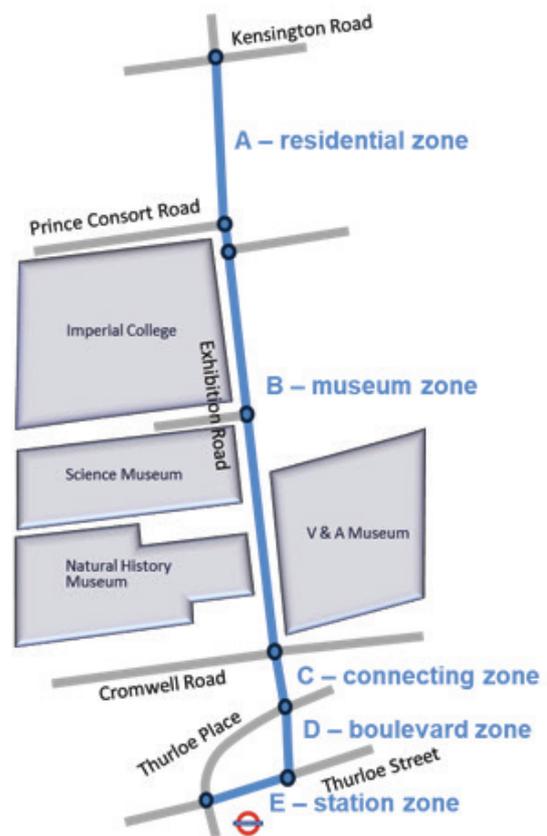
Exhibition Road is a restricted parking zone and parking is prohibited everywhere except in marked bays. There is no visitor parking in Exhibition Road. The nearest pay and display bays are in Prince Consort Road and Queen’s Gate.

A restricted parking zone prohibits parking but allows loading at all times. Vehicles can drop off and pick up passengers but must not wait. There are coach drop-off and pick-up areas on Cromwell Road, outside of the V&A and the Natural History Museum.

As described in the technical data section, the peak hour flows have reduced on all sections of the street, although they are still relatively high. As shown in the table below, peak hour flows are approximately 1,400 veh/hr, 900 veh/hr and 600 veh/hr for sections A, B and C, respectively.



Exhibition Road tactile map





Location	Before		After	
	AM	PM	AM	PM
A: Prince Consort Road to Kensington Gore	1507	1520	1314	1455
B: Prince Consort Road to Cromwell Road	1124	1150	803	923
C: Cromwell Road to Thurloe Place	595	775	608	610
D: South of Thurloe Road (one way)	649	749	57	47

Pre & post-scheme peak hour flows

Ease of Movement – Pedestrian Movement

Footfall along Exhibition Road ranges between 6,400 and 8,200 pedestrians per day in Sections B, C, D and E, peaking at around 3,300 pedestrians per hour in all four zones. In the section between Hyde Park and Prince Consort Road, there are 1,750 pedestrians per day, and a maximum of 600 peds/hr.

Pedestrians generally keep to the comfort spaces in section A, although regularly spill out into the transition zone in sections B and C. In section D, however, because of the sense of place and low traffic flows, pedestrians frequently walk within the running surface.

In the evening peak hour (5 p.m.–6 p.m.), section E is the busiest area for crossing movements with 1,800 peds/hr, followed by section B, close to Imperial College, with 800 peds/hr. The southern half of section B and sections C and D have similar crossing flows of 300–400 peds/hr. Crossing flows in section A are lower at 200 peds/hr

From the two-year monitoring study, it was concluded that, in general, pedestrians appear to use the full extent of road sections (that are clear from obstructions) to cross. Therefore, the crossing patterns are random and are made freely.

The volume and location of crossing movements appear to be influenced by the proximity of formal crossings (at signalised junctions) and informal crossing points (such as pedestrian refuges and the central median defined by lighting mast bases). If located close by, pedestrians will use these crossing facilities rather than crossing elsewhere on a link. From observation, pedestrian crossing movement is also guided by the location and occupancy of parking bays and street furniture, including cycle stands, docking stations and benches.

²Surveys undertaken by Crowd Dynamics on a weekday between 14:00-15:30.



From observational surveys undertaken by Crowd Dynamics, a low level of courtesy has been observed on Exhibition Road, with 20% courteous drivers recorded at the junction with Prince Consort Road and an overall courtesy level of 5% along the length of Exhibition Road.

Before the road was transformed, there were relatively few crossing points, traffic flows were higher, and crossing distances were much greater. Therefore, despite the lack of crossing points, it is likely that the average delay for crossing has reduced.



Prince Consort road junction – courtesy levels are at 20% for these uncontrolled crossing points

Ease of Movement – Cycle Movement

In the peak hour, there are between 100–150 cyclists travelling through Exhibition Road in sections A to C, with much lower numbers in sections D and E.

As the running surface is 7–8 m wide and vehicle flow is relatively high, some cyclists use the comfort space. This is particularly evident on junction approaches where traffic is queuing and at the corners.

Improved Safety and Public Health

The average hourly 85th percentile speed is relatively high at 22–26 mph for sections A and B where the speed limit is 20 mph. For sections C and D, speed is lower at between 14–18 mph.

The speed was higher in section A and the northern part of section B where there was less pedestrian activity on long, straight links with a more traditional street layout (fewer transition zones, regular parking arrangement and/or wider carriageway).

Traffic flow has reduced in all sections of the street, particularly in the busy areas close to the museums and Imperial College, where flows are 24% less than before. Therefore, the exposure to emissions is likely to have decreased.

Information on collisions at Exhibition Road have been collected from the website crashmap.co.uk. The maps below display the location and severity of all the collisions recorded for the four years before construction began (2005–2008) and for the four years after completion of the scheme. The maps show that there is a clear clustering of collisions around the junctions at either end of the road and at the junction with Prince Consort Road. Collisions have been reduced overall in both number and severity. The number of collisions involving pedestrians are largely the same in both periods, but severity has been reduced. The number of collisions involving pedal cyclists has risen. However, the majority of these collisions are classified as 'slight', whereas previously, the majority were 'serious'. In the post-construction plan, a cluster of pedal cycle collisions is seen around the junction with Prince Consort Road.



Key for crashmap information:

Incident Severity

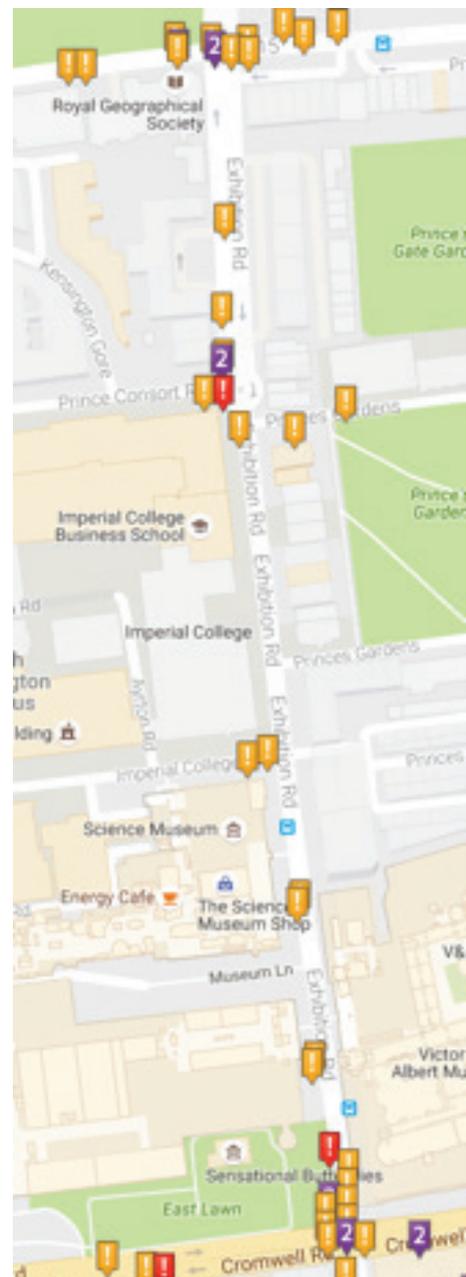


All casualty Types:

Before construction (2005-2008)



After Completion (2012-2015)



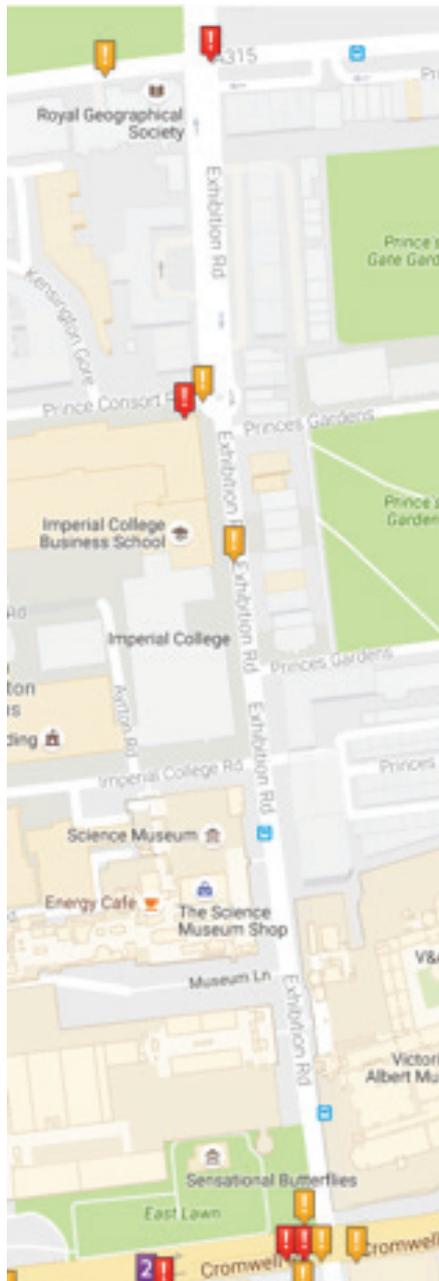


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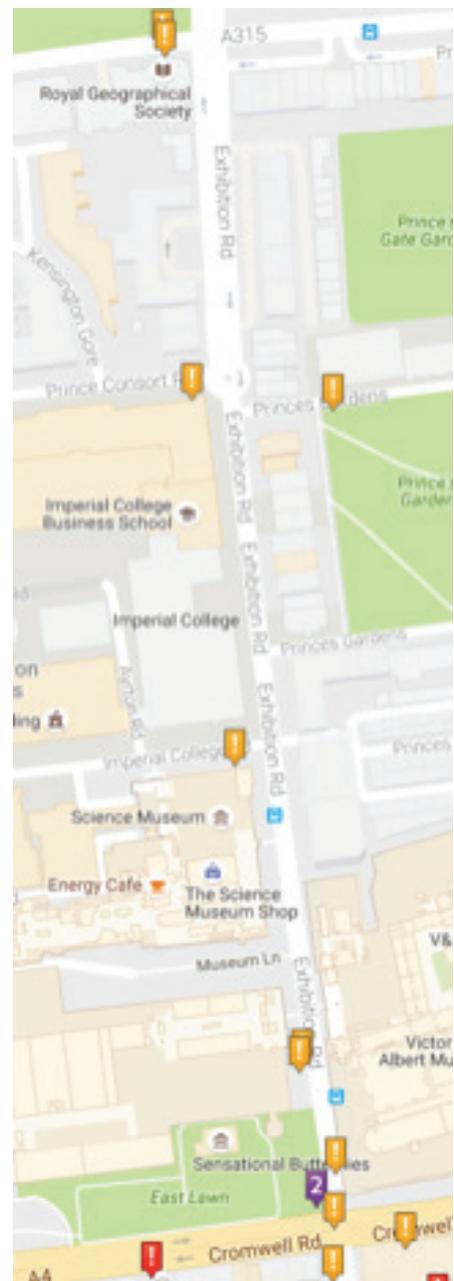


Pedestrian Casualties:

Before construction (2005-2008)



After Completion (2012-2015)





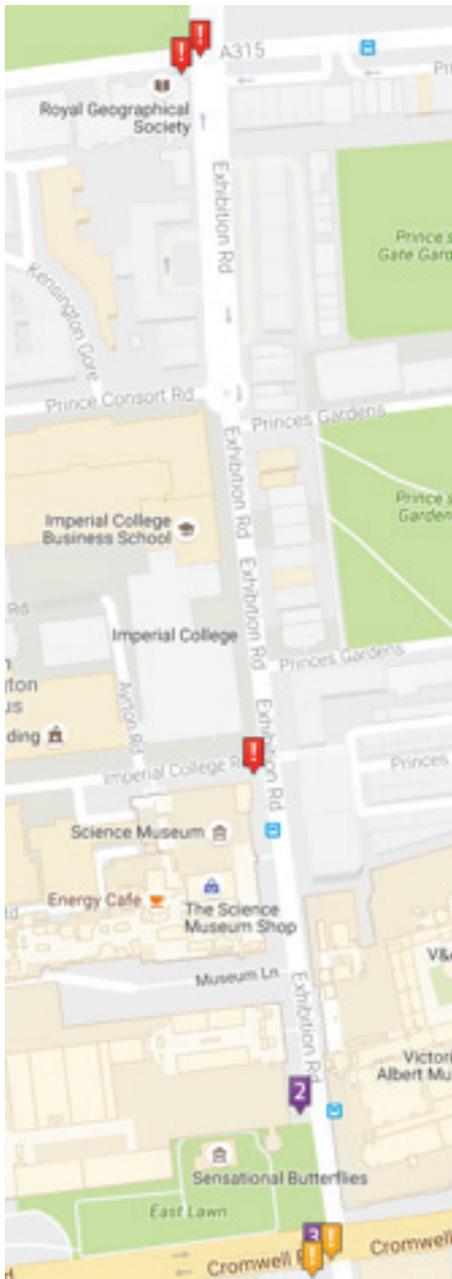
Key for crashmap information:

Incident Severity

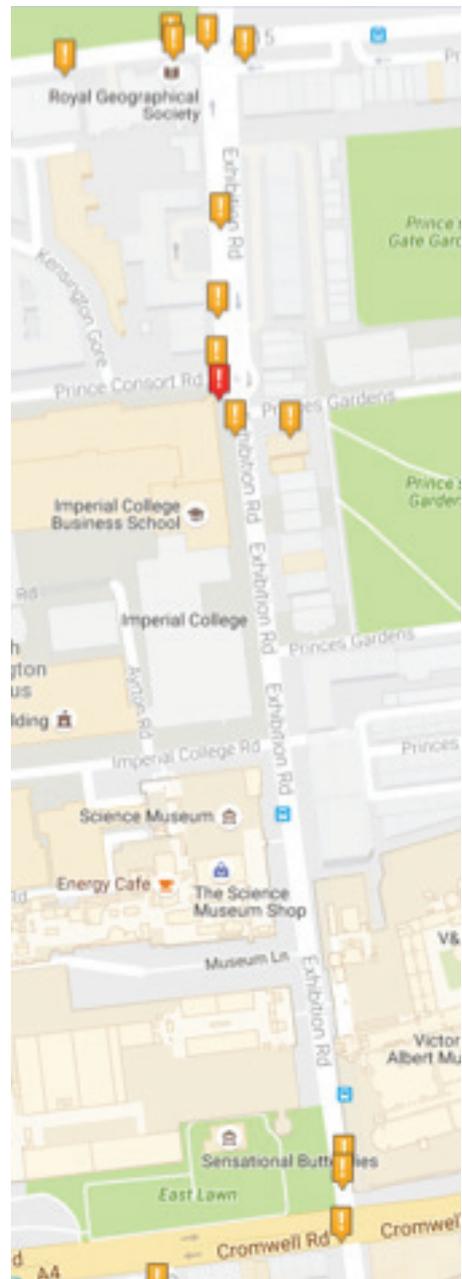


Pedal Cycle Casualties:

Before construction (2005-2008)



After Completion (2012-2015)





Quality of Place

The unique design makes Exhibition Road a landmark destination, which is important given the vast number of people that visit every year because of the internationally renowned museums and institutions that line the road.

The central theme of the design is to create a high quality open space that provides flexibility of use and freedom of movement.

Some of the key features of the design are

- level surface and continuous chequered surface throughout
- 20 mph speed limit north of Cromwell Road, 30 mph to the south
- minimal signs and road markings
- use of pedestrian zones outside tube station and restricted zones elsewhere
- minimal street furniture
- raised bus stop kerbs (the only raised surface areas in the street)
- 800 mm corduroy delineator paving next to black cast iron drainage channel
- one-stage crossings at junctions
- no controlled crossings on links

The street has a relatively consistent profile along its length, and as shown in the diagram below, it is divided into four zones: comfort spaces (4 m) for pedestrians on each side, a transition zone (8 m) with parking and street furniture and a vehicle running surface (7–8 m). The edge of the running surface is delineated by a drainage channel and/or the bases for the lighting masts.

The surface is formed from 22,000m² of pink and grey granite setts. From anecdotal evidence, views on the success of the chequered pattern are mixed.

Along the centre of the street, there are 22 steel lighting masts that are 20 m high. There are many mature trees on both sides of the street. Some of the semi-mature trees were replaced and re-positioned to provide more footway space.

Street furniture is minimal and is largely limited to benches, cycle stands, three-cycle hire stations and lighting masts.



Street profile defined for different uses



Section B, Natural History Museum on left. High footfall and place activity



Section D, view north. Informal seating and outdoor dining areas in connecting zone

In terms of character and place, the road can be divided into five zones as shown on page 7. Section A mainly contains residential properties and has no through routes so is a north-south link with no place activity.

Section B contains the museums and Imperial College. It has several through routes and many building entrances, so there are many crossing movements and high level of localised activities outside the entrances to major attractions. The placement of benches in this area encourages people to stay.

Section C has no active frontages and largely acts as a connector although the raised base for the light well acts as a seating area.

Section D has much more of a place function than the other areas as pedestrian footfall is high and traffic speed and traffic flows are low.

Also, unlike the other areas, there are no parking, cycle stands or benches in the transition zone. Instead, it is used for outdoor dining to serve customers of the adjacent cafes and restaurants. The management of the tables and chairs in this area involved an innovative method of control based on an agreement between the council and the local landowner.

Exhibition Road is well maintained with monthly inspections of the carriageway, footway and street furniture. Section D is washed every weekday for one hour between 7 a.m. and 8 a.m.

Economic Benefits

No information is available on the economic benefits of the scheme. However, given that the capacity of the restaurants and cafes in section D has been extended because of their outdoor dining provision, it is likely that their custom has increased.

The transformation of Exhibition Road has undeniably given the street a new identity. For the vast majority of people, it provides a better overall experience, which should encourage them to return.

Whilst there is no before data on pedestrian footfall to compare with the post-implementation survey data, it is highly likely that pedestrian numbers have increased and people spend longer in the area. This benefits the local economy. With more tourists, it also benefits London.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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More Inclusive Environment

Neutral	Insufficient information
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The use of a level surface has been controversial, with initial pressure from certain groups leading to design changes to introduce comfort spaces delineated with tactile paving to help visually impaired people to navigate the street and cross the road. However, before the scheme could be completed, on-street trials with mobility and visually impaired people were required to demonstrate that the corduroy delineator paving was overpassable and detectable by these groups. These trials were successful. However, the absence of controlled crossing points along the road is an issue for some visually impaired users.

The introduction of a tactile map and audio guide was a useful and innovative measure to aid visually impaired people. No information is available regarding how well visually impaired users are able to understand the layout of the street.

Ease of Movement

+ve

The level of service along the road has been significantly improved for pedestrians through widening footways, removing street furniture and providing extra width in the transition zones. A greater freedom of movement has been achieved by adopting a kerb-free, single-surface design, which has a consistent profile along the length of the street.

In general, pedestrians appear to use the full extent of the road to cross. Hence, the crossing patterns are random and are made freely. Some people are drawn towards informal crossing points that are created by the lighting mast bases and pedestrian refuges.

Exhibition Road has a low level of courtesy. Hence, most pedestrians have to wait for vehicles to pass before crossing the road. However, before the road was transformed, crossing points were relatively few, traffic flows were higher, and crossing distances were much greater. Therefore, despite the lack of crossing points, the average delay for crossing has reduced. Traffic flow has reduced throughout Exhibition Road, particularly in the area between Prince Consort Road and Cromwell Road.

There are no priority measures for cyclists. Hence, they are required to mix with general traffic. However, cyclists often use the comfort space, particularly where there is queuing traffic, to cut corners at junctions.



Improved Safety and Public Health

+ve

Traffic speed is relatively high in north of Cromwell Road, particularly in section A and the northern part of section 2 where pedestrian activity was less on long-straight links with a more traditional street layout (fewer transition zones, regular parking arrangement and/or wider carriageway).

Traffic flow has been reduced in all sections of the street, particularly in the busy areas close to the museums and Imperial College, where flows are 25% less than before. Therefore, the exposure to emissions is likely to have decreased.

Overall, collisions – in both number and severity – has been slightly reduced.

Quality of Place

+ve

The scheme has been transformative in terms of the quality of the streetscape, consistency of treatment and, in several areas, the sense of place. Although opinions are different, the chequered surface has helped give the street a new identity that is befitting of its status as a world-renowned tourist destination.

The street has been completely decluttered and was implemented with the bare minimum of signs and road markings required to achieve its desired functionality. However, after monitoring studies were undertaken, it became apparent that some drivers did not understand that certain movements were prohibited. Hence, a number of bollards, signs and road markings were subsequently introduced.

Economic Benefits

Neutral	Insufficient information
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There is no information available on the economic benefits of the scheme. However, the trade for the restaurants and cafes at the southern end of the road is likely to have increased because of the outdoor dining areas in the zone. The transformation is likely to draw more Londoners and tourists to the attractions in the area, which will benefit the local economy and London as a whole.



Case Study 3: Holbein Place, Royal Borough of Kensington and Chelsea

Pedestrian Prioritised Street, Link

1. Introduction

The shared-space scheme at Holbein Place is situated directly outside Sloane Square, London underground station; it accommodates one lane of traffic travelling out from the square only. This scheme is very small, stretching only 13 m long with a 3 m wide carriageway. The narrow nature of this scheme encourages slow driving speed.

Before the implementation of this shared-space scheme, there were traffic signals, guard railings and road markings. These were removed to declutter the area. There is now a clear line of sight from the entrance of the tube station across the road, highlighted through the continuation of material across the footway and carriageway (see Figure 1).

There is a slight incline from the carriageway joining Holbein Place from the Sloane Square gyratory system, which acts as a speed hump and encourages drivers to reduce their speed on entrance into the shared-space scheme. The carriageway and footway are on a level surface, with tactile paving at the edge of the footway to indicate appropriate crossing points and help visually impaired people to navigate the space. There are also 300 mm wide paving stones of a darker material to act as a visual kerb at the edge of the footway.



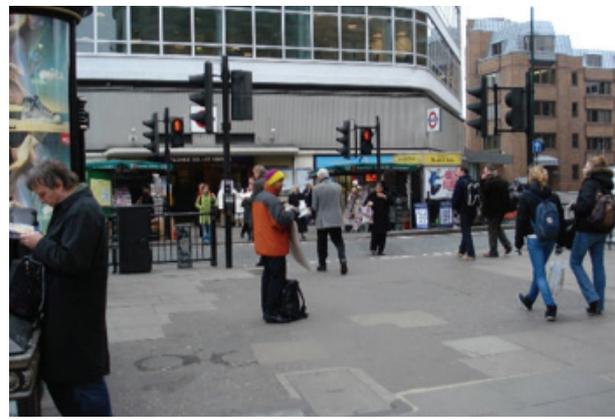
Figure 1: The shared space scheme at Holbein Place. This image shows that there is a sign to pedestrians to be aware of oncoming traffic

Aims

- To improve traffic flow and reduce congestion in Sloane Square
- To reduce pedestrian waiting times
- To create an attractive environment outside Sloane Square tube station



Images Before





Images After



2. Technical Data

Dates	Construction began on Holbein Place in early 2008 and was fully complete later that year
Traffic Volumes	Approximately 350 vehicles pass through this scheme per hour
Traffic Speed	The average motor vehicle speed at Holbein Place is 9.87 mph
Pedestrian Volumes	Footfall along Exhibition Road ranges from 6,400 to 8,200 pedestrians per day in the sections between Prince Consort Road and South Kensington tube station, peaking at 3,300 pedestrians per hour. In the section between Hyde Park and Prince Consort Road, there are 1,750 pedestrians per day
Road Safety	There has been negligible change in the number of collisions, with an increase in severity

3. Evaluation

Inclusive Environment

A safety audit, carried out in 2008, highlighted that the lack of delineation between the footway and carriageway may prove problematic for visually impaired users. The design plans were altered to include a darker band of stone between the footway and carriageway, but the area was kept as a level surface. Other issues raised in the safety audit were largely concerned with very detailed design elements, for instance, relating to the positioning of signing.

There is currently little evidence on the representation of vulnerable users (e.g. older, disabled, visually impaired, children). Collecting information on this would be helpful in assessing the inclusivity of the scheme.

Ease of Movement

This area is heavily used by multiple modes of transportation. A good pedestrian access here is important as approximately 3,500 pedestrians per hour cross at peak times because of its proximity to the tube station.



Figure 2: Heather wick Studio designed newspaper Kiosk



Before the implementation of the shared-space scheme at Holbein Place, there was a pelican crossing with a 50-second cycle, allowing five seconds of a green-man pedestrian signal and six seconds of a flashing amber signal. This resulted in only six minutes per hour of a green-man signal. As a result, many pedestrians disobeyed the signals. Hence, it was suggested to either reinstate the previous zebra crossing at this location (removed in 1990) or create an area with no formal crossing in accordance with shared-space concepts. Clearly, the latter option was chosen based on the predicted benefits on pedestrian movement.

In 2007, before the construction of the scheme, the Royal Borough of Kensington and Chelsea carried out a seven-day ATC and recorded that an average of 5,882 vehicles used the area in a 24-hour period with up to 450 vehicles one-way per hour in peak times. In 2012, the average peak hour traffic flow was recorded at 350 vehicles. Hence, vehicle flows in this area has been significantly reduced since the implementation of the shared-space scheme. Overall, traffic volumes are low at Holbein Place.

Drivers do not appear to act in a particularly courteous manner at this scheme, with an observed courtesy rate of 20%. This means that on average, only one in five drivers gives way to pedestrians. In locations with higher footfall, drivers will be less courteous as the chance of waiting for numerous pedestrians to cross in front of the vehicle is greater.

Improved Safety and Public Health

Based on a seven-day ATC carried out in 2007, the mean vehicle speed at this time was 20.8 mph with an 85% speed of 26.2 mph. In 2013, the mean speed at this location was recorded as 9.87 mph. Therefore, motor vehicle speed at Holbein Place has significantly decreased. The current mean speed is significantly slower than most road speed in the UK. However, vehicles are only required to slow to this extent whilst travelling through the scheme, which is very short. Hence, these slow speeds have little impact on the wider traffic flow in the area.

In 2013, Clarkson May recorded that this shared space scheme has a low post encroachment time (PET) of 2.68s. PET indicates the time between two road users occupying a common spatial point. Hence, a low PET demonstrates a freer flowing arrangement and greater mixing of road users. A low PET indicates that the space is perceived to be safe as pedestrians are not afraid or intimidated to walk in the carriageway with motor vehicles.

Information has been collected on collisions in this area for three years before and after the implementation of the scheme, excluding the construction period. This information indicates that the number of collisions occurring within the vicinity of the shared space scheme, from one 'slight' to two 'serious' collisions, have slightly increased. None of the collisions in the post-implementation period appear to have occurred within the area of the informal shared-space crossing.

The maps below illustrate where the collisions have occurred in this area in the three years before construction and in the three years after completion.



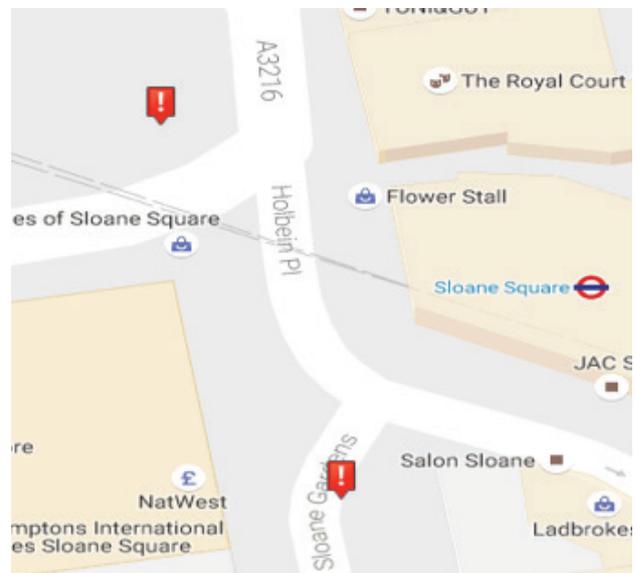
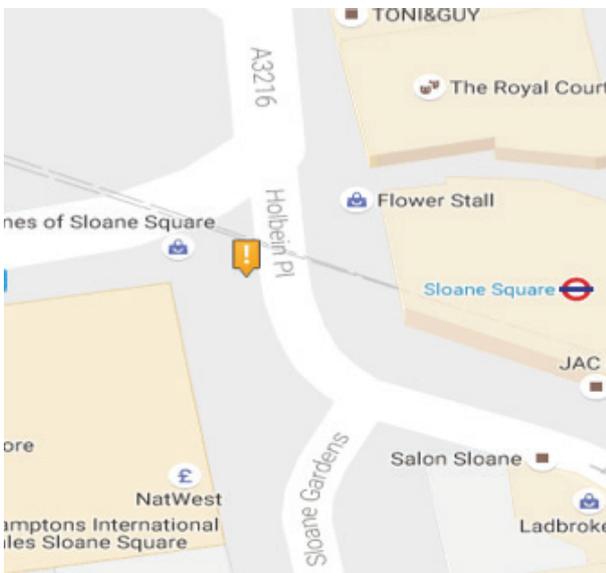
Key for crashmap information:



All Casualty Types:

Before construction (2005-2007)

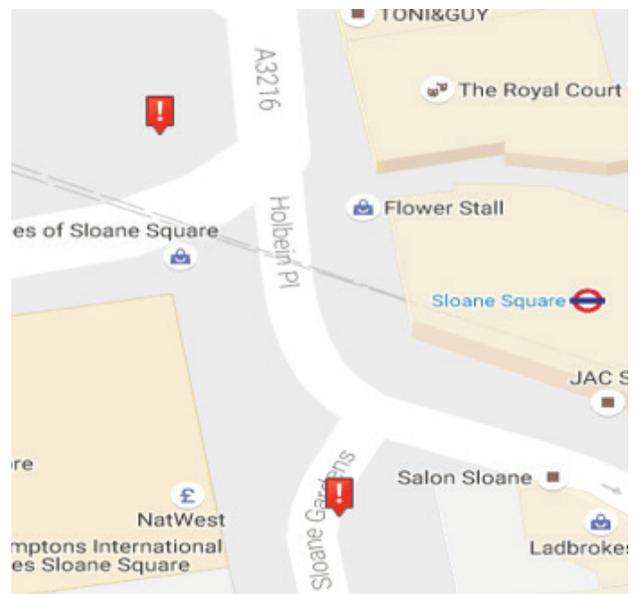
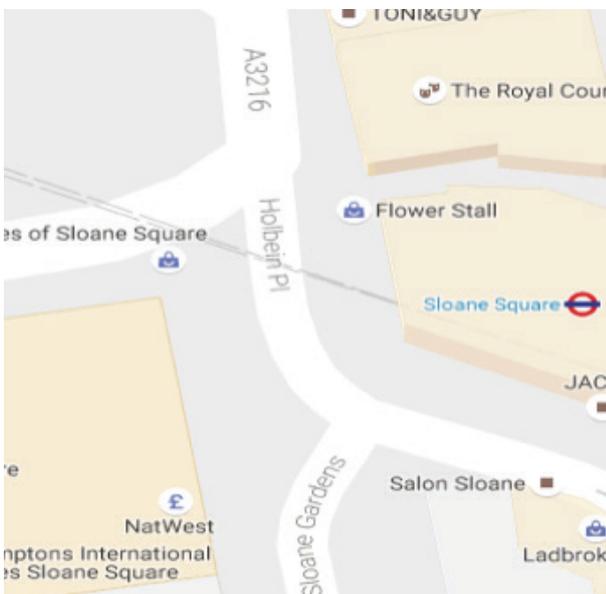
After completion (2009-2011)



Pedestrian Casualties:

Before construction (2005-2007)

After completion (2009-2011)





Quality of Place

Street furniture in this area is minimal, creating a clear and uncluttered space. However, there are cycle stands next to Sloane Square tube station and bicycle hire availability, both of which are useful.

High quality granite slabs have been used to pave this scheme, creating an attractive passage across the road. However, there is little colour contrast in the materials in the footway and carriageway, which is problematic for visually impaired people.

The Royal Borough of Kensington and Chelsea commissioned Heatherwick Studio to design a more attractive and less cluttered newspaper kiosk as part of this scheme. The new kiosk is situated directly across the road from Sloane Square underground station and is made from bronze rather than plastic and fiberglass, which are more common materials for these structures. This creates an attractive and functional feature in the space (see Figure 2). Newspaper kiosks of this design have been installed in another location in the borough.

This area is well maintained as the Royal Borough of Kensington and Chelsea carries out monthly inspections of principal roads and heavily used footpaths, including Sloane Square. These inspections record the conditions of footways, carriageways and street furniture and note any further potential hazards. Any urgent defects are repaired within 24 hours. Extensive street cleaning and washing are carried out every three months.

Economic Benefits

There is no evidence on whether this scheme has had any economic benefits on surrounding local businesses. However, this is already a very prosperous area with many high-end retailers in the immediate vicinity. The scheme is situated near Kings Road, which is internationally renowned as a fashion and pop culture hot spot. Indeed, economic revival was not one of the objectives of this scheme.

Cycle parking outside Sloane Square underground station is sufficient, with a capacity for approximately 50 cycles. TfL cycle hire is also available at this location with more than 25 bike spaces.

There are several small car parks in the surrounding area, with a range of prices and restrictions. There is also some on street parking, but this is generally more limited and largely available only for loading or for local residents.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Neutral	Insufficient information
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The inclusivity of this scheme has been criticised as it may disadvantage blind and partially sighted people. No factual data is available on the use of the street by people with disabilities. The mobility impaired will have benefited from the level surface or crossing points, but the usability of the street by the visually impaired is not known.

Ease of Movement

+ve

The scheme has proved effective in accommodating very high volumes of pedestrians (3,500/hour) whilst maintaining low motor vehicle flows. Motor vehicle speed has significantly reduced at Holbein Place and the mean speed recorded in 2013 was 9.87 mph.

Improved Safety and Public Health

Neutral

Before-collision rate at the site before and after implementation period was very low, with no significant change.

Quality of Place

+ve

The public realm improvements in this shared space development have created a clearer and much less cluttered environment with an attractive and well-maintained street scene. The site is immediately adjacent to Sloane Square tube station, and there is good provision for cycle parking.

Economic Benefits

Insufficient information

There is no evidence on whether this scheme has had any economic benefits on surrounding local businesses.



Case Study 4: Leonard Circus, London Borough of Hackney

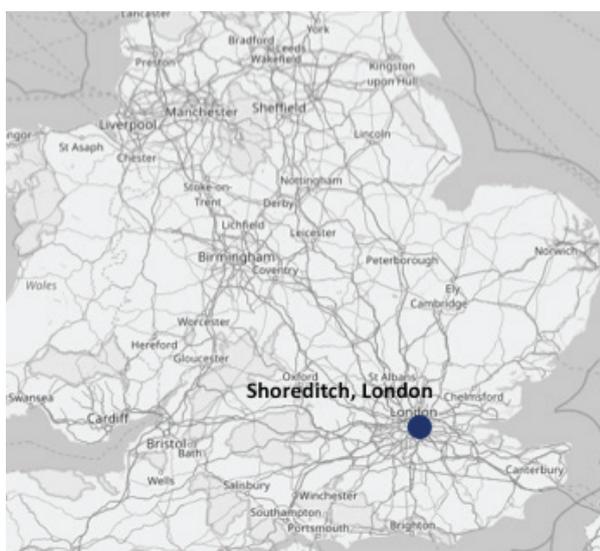
Pedestrian Prioritised Streets, Junction

1. Introduction

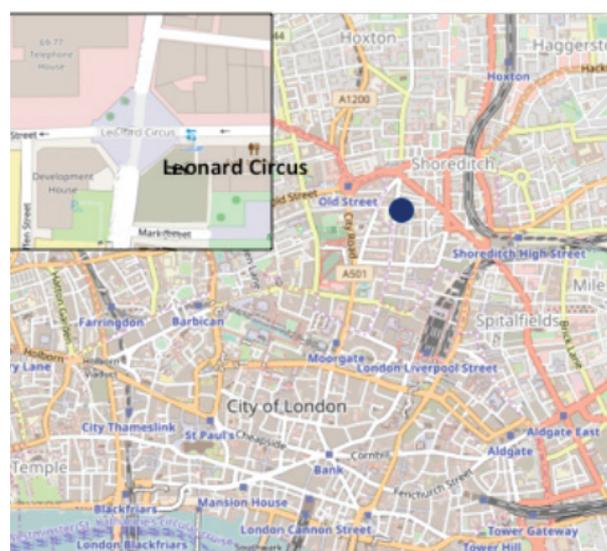
The Leonard Circus scheme was implemented by the London Borough of Hackney in 2014. It is the first of several planned public-realm improvements to create a legible network of interlinked streets and places in the Shoreditch area.

The previous road layout at Leonard Circus was clearly designed with the motorists in mind, with excessive carriageway space, no crossing points and a dominance of road markings. A large underutilised paved area protruded out into the centre of the junction, which contained several trees and benches. However, despite the large sculpture known as the 'Hitchcock Reel' positioned in the centre of the junction, this public space and the junction generally lacked identity.

This award-winning scheme was designed in-house by LB Hackney. It has created an informal town square where two roads intersect.



Scheme location in England



Scheme location in London



There is a footway with a low-height kerb around the outskirts of the square, but the main area is open for all road users to share. In this area, trees and benches indicate paths of vehicular travel. With the distinctive surfacing materials and patterns, these features encourage low driving speed and create a more attractive public realm.

Unlike some of the other case studies, this scheme has been able to create a new public space within the confines of the junction itself, rather than dedicating areas for place activities. The balance of priorities has been shifted from motor vehicles to pedestrians and cyclists.



Leonard Circus transformed: the running path for vehicles is subtly implied through the careful placement of trees and benches

Aims

- To improve road safety
- To improve the pedestrian environment and experience
- To create an attractive and sustainable public space
- To help regenerate the area and grow the local economy



Images Before





Images After





2. Technical Data

Dates	Construction began in January 2014 and was completed in June 2014
Cost	Approximately £500,000
Traffic Volumes	Approximately 150 vehicles pass through this scheme every hour
Traffic Speed	The 85th percentile speed was recorded as less than 20 mph
Pedestrian Volumes	Up to 1,400 pedestrians use this scheme per hour
Pedestrian Crossing Movements	It is difficult to determine crossing movements in the traditional sense because of the open nature of the scheme. However, survey results show that nearly 80% of pedestrians cross within the shared area rather than following the footways
Road Safety	No recorded collisions for five years before or two years after implementation of the scheme

3. Evaluation

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic Benefits

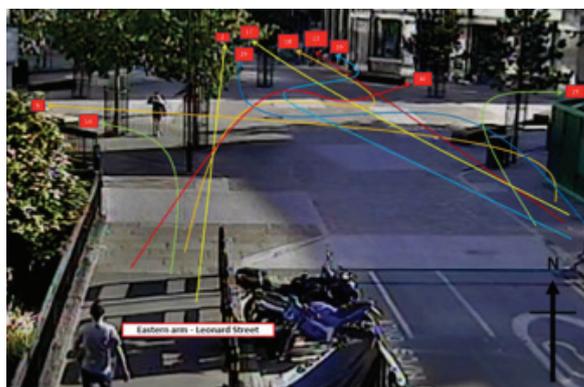
Inclusive Environment

There is little or no evidence regarding the presence of vulnerable users. However, a comprehensive consultation with a number of different interest groups before implementation and concerns raised by the Disability Back Up group resulted in some alterations to the design, such as the inclusion of a 25 mm kerb that runs along the footway.

Next to the kerb is a drainage channel which provides colour contrast between the footway and shared area. Tactile paving on either side of the road at the entry points to the junction indicates uncontrolled crossing points.

Ease of Movement – Pedestrian Movement

A high proportion of crossing activity takes place within the shared area. The diagram opposite shows the different routes taken from the eastern arm (Leonard Street).



Eastern arm: Leonard Street



In the morning peak hour, for this arm, half of the 400 movements were made through the shared areas (between the trees). For the other three arms, crossing movements within the shared areas were approximately 90% of the total.

In the 2014 survey, many people highlighted being able to move freely through the space. The survey results are detailed throughout Section 3.

Because of the largely free movement of pedestrians, it is difficult to determine waiting times of either pedestrians or vehicles. Generally, road users adapt their speed to navigate around each other, so few users need to stop.

Ease of Movement – Cycle Movement

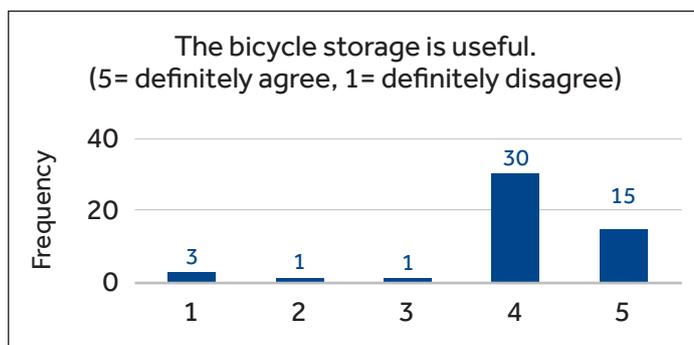
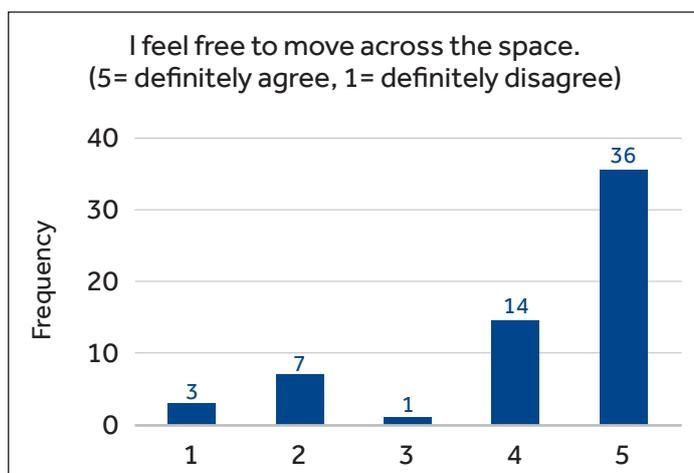
Previously, there was a contraflow cycle lane from the western arm of Leonard Street through to the northern arm of Paul Street. This movement is still permitted. Cyclists can also now travel in both directions along the southern part of Paul Street.

In 2016, Cycle Superhighway 1 (CS1) was completed. This runs along Paul Street though Leonard Circus. CS1 experiences high flows of cyclists during the peaks. There is anecdotal evidence of some collisions between cyclists and pedestrians.

Survey results show that the feeling towards the provision of cycle parking in Leonard Circus, with almost half of the survey participants indicating that they have no opinion on the usefulness of the cycle parking, is largely neutral. However, this may be because of a lack of personal use from these individuals.

Ease of Movement – Vehicle Movement

Drivers appear to be highly courteous at this junction. Because of the low vehicle flow, there was only a small number of hourly interactions with other vehicles, pedestrians or cyclists. In an hour of observation carried out by Crowd Dynamics in 2014, only four pedestrians were observed to need to wait for a vehicle to pass.





Improved Safety and Public Health

The 85th percentile speed was recorded at less than 20 mph (speed limit is 20 mph).

Whilst speed is low overall, the open nature of the junction and clear sightlines mean that the speed is higher at night and weekends when there are fewer pedestrians.

Often a key feature of pedestrian-prioritised streets is the reduction or total removal of signing. This is intended to make road users more aware of their behaviour in the context of their environment, rather than relying on signs or signals. In the survey carried out by LB Hackney, a similar number of people agreed as disagreed to the question of whether signing at Leonard Circus is adequate.

When asked about feelings of personal safety, the majority of responses were positive.

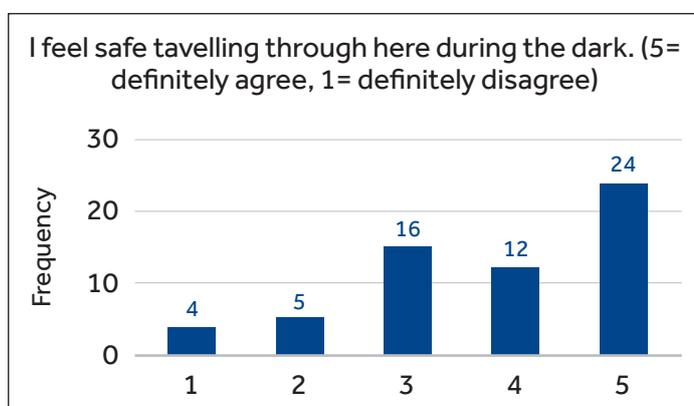
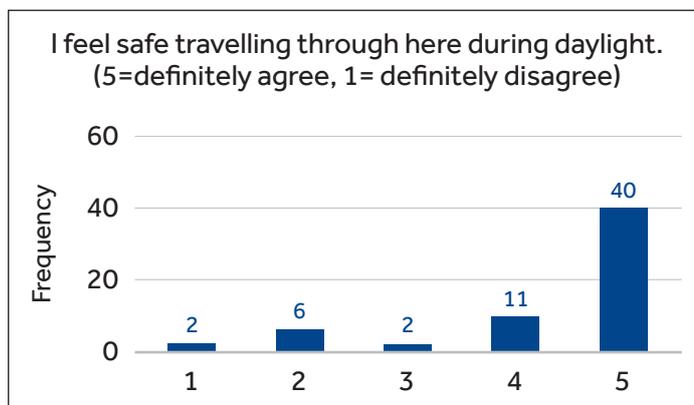
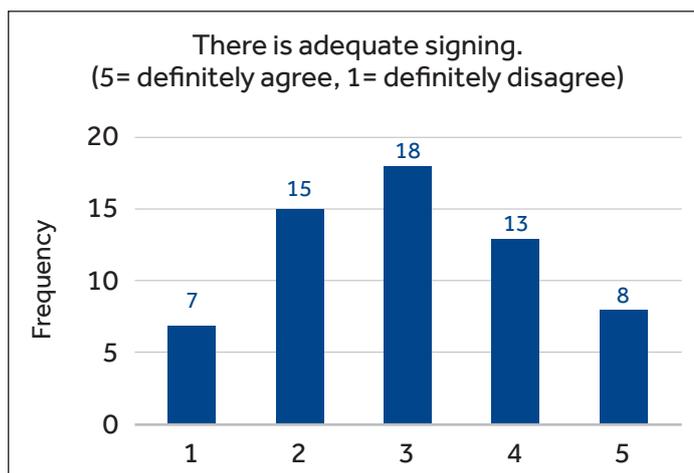
There were fewer positive responses regarding travelling through the scheme in darkness. However, people generally feel less comfortable walking at night.

Those that had experienced the previous road layout tended to acknowledge that the road now feels safer.

Using the website crashmap.co.uk, no collisions were recorded for the five years before the construction of the shared-space scheme or in the two years since completion of the scheme. However, one collision involved a pedestrian during the construction period.

Quality of Place

This scheme is organised in the style of a town square, with the provision of flexible-use areas, placement of street trees and the abstract pattern of different surfacing materials. All provided a message to drivers that this is not a typical junction, and as such, they should adapt their behaviour accordingly.





York stone has been reused from the previous footways to pave the majority of the edge of the square. A mix of contrasting granite blocks and Italian porphyry paving has been used in the centre.

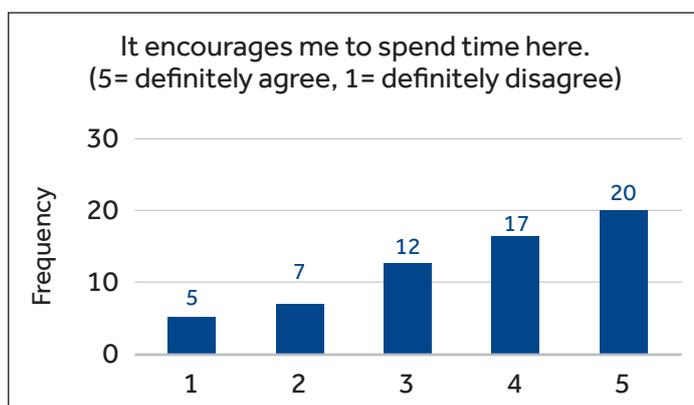
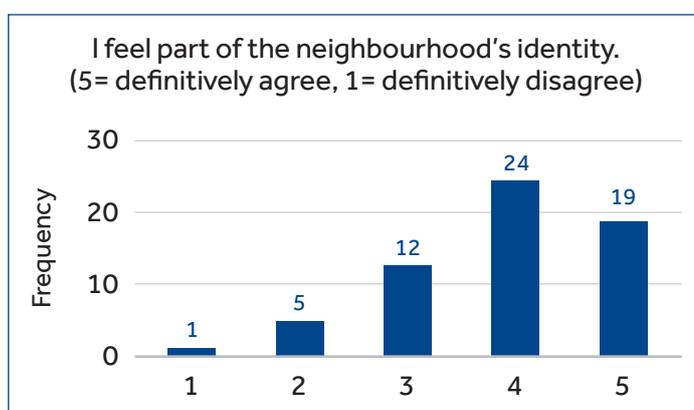
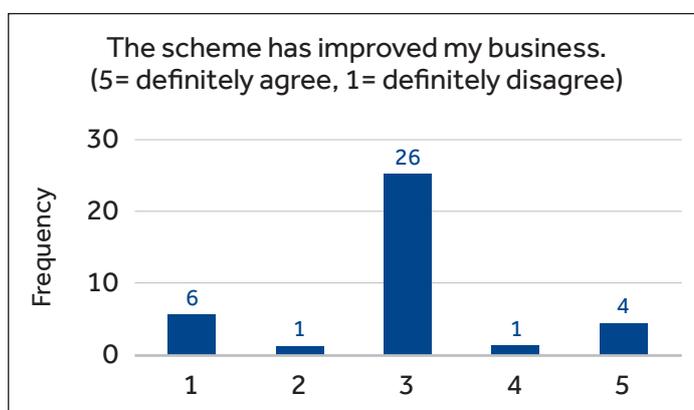
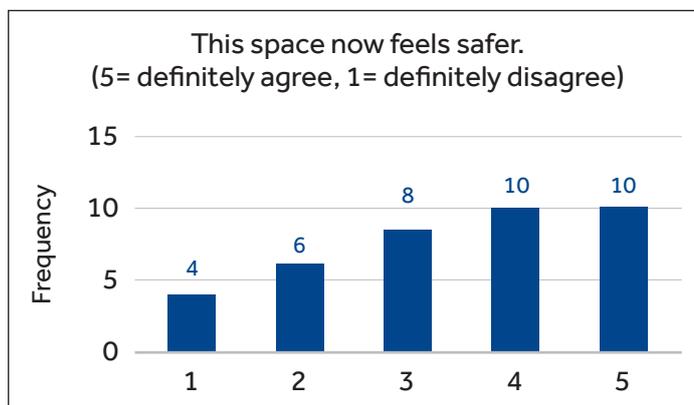
Nine trees have been introduced, the location of which was partly determined by the need to avoid underground services. In addition to slowing traffic and improving the sense of place, the trees were also provided to give shade and help improve air quality.

Other street furniture that features in the scheme include benches, bins and low-energy LED lighting columns.

Alongside the footway, on each side of the junction are areas used as flexible spaces for food stalls and events.

In a survey carried out by LB Hackney in 2014, the majority of the 61 people surveyed acknowledged that the scheme has created a greater sense of identity and encouraged them to spend more time in this area. Overall, most people agreed that Leonard Circus is an attractive place.

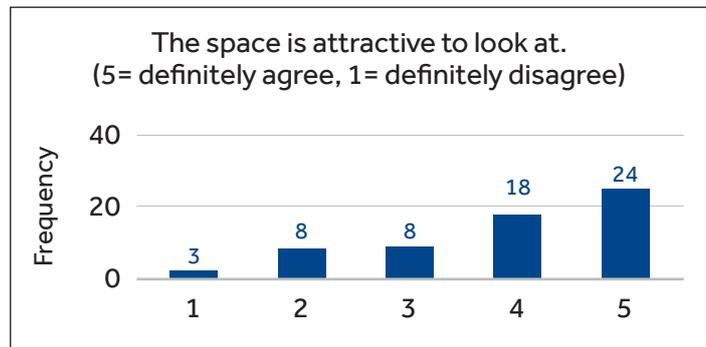
The junction has been designated as a restricted parking zone (RPZ), within which parking and loading are not permitted at any time. The use of an RPZ means that using yellow lines to indicate the parking restrictions, which would have otherwise detracted from the quality of the streetscape, is unnecessary. In July 2015, this scheme won the Urban Transport Design Awards.





Economic Benefits

It was expected that the transformation of the junction would help regenerate the area and grow the local economy. However, there is currently little evidence to validate whether this has been effective. In the survey by LB Hackney, local business owners were asked if the scheme had improved their business. Most respondents indicated that it has had a negligible impact.



This scheme has generated a space for new activities such as food stalls and public events. Whilst these are taking place, the square still functions normally in terms of traffic and pedestrian movement.

To support justification for the scheme going ahead, the World Health Organisation's health economic assessment tool (HEAT) was used to estimate the likely economic benefits from more people walking and cycling because of the scheme. It was estimated that the economic benefits of walking and cycling over a 10-year period are £17 million and £2 million, respectively.

As with the previous layout, there is no car parking provision within the junction. However, there is street parking on the surrounding roads and a car park on Clere Street, just off Leonard Street. Therefore, parking provisions will not have an impact on businesses.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Neutral	Insufficient information
---------	--------------------------

There is little or no evidence regarding the presence of vulnerable users. However, a comprehensive consultation with a number of different interest groups before implementation and concerns raised by the Disability Back Up group resulted in some alterations to the design, such as the inclusion of a 25 mm kerb that runs along the footway.

Ease of Movement

+ve

Drivers appear to be highly courteous at this junction and generally adapt their speed to navigate around other road users, so occasions when they need to stop are few. The relatively low vehicle flow is also a factor in generating this behaviour.

A high proportion of crossing activity takes place within the shared area rather than people following the footways, approximately 50% for one arm and 90% for the other three arms. In the 2014 survey, many people highlighted being able to move freely through the space.

Improved Safety and Public Health

Neutral

Traffic speed through the junction are less than 20 mph. In the two years since completion of the scheme, there have been no reported collisions. In the survey undertaken by Hackney, most people said that they feel safe travelling through the junction in the daytime.

Quality of Place

+ve

The provision of flexible-use areas, placement of street trees and the abstract pattern of different surfacing materials provide a clear message to drivers that this is not a typical junction. As such, they should adapt their behaviour accordingly. This change in behaviour, along with the increased activity on street, has contributed significantly to the dramatic improvement in the quality of place and shift in priority, from motor vehicles to pedestrians and cyclists. In the 2014 survey, the majority of respondents said that the scheme has created a greater sense of identity and encouraged them to spend more time in this area.

Economic Benefits

Neutral	Insufficient information
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It was expected that the scheme would help regenerate the area and grow the local economy. However, there is currently little evidence to validate whether this has been effective. When local business owners were asked if the scheme had improved their business, most respondents indicated that it has had a negligible impact. However, this scheme has generated space for new activities such as food stalls and public events. Consequently, income will be generated for the businesses involved.

The analysis undertaken to support the business case identified that the health economic benefits from more people walking and cycling would be substantial. The levels of walking and cycling are high, and, therefore, these benefits are likely to be significant.



Case Study 5: Fountain Place, Poynton, Cheshire

Informal Street, Link and Junction

1. Introduction

The scheme in Poynton was commissioned by Cheshire East Council to help regenerate the town centre. A study of the declining performance of the town indicated that the severance to pedestrian connectivity created by heavily trafficked roads was a major factor in the poor performance of the town centre.

The fundamental aim of the scheme was the reinvigoration of the town centre. Eighty-seven percent of Poynton residents agreed the centre needed revitalising. A Northwest Development Agency research showed Poynton was the fourth worst failing retail centre in Cheshire. To deliver these regeneration improvements to pedestrian connectivity to the town centre and pedestrian amenity within the town centre was considered a fundamental requirement. Impacts on traffic were not a key consideration.

The scheme comprises two major elements: phase 1 was the transformation of Park Lane (main shopping street), and phase 2 was the transformation of Fountain Place, previously a large signalised junction at the intersection of the A523 Macclesfield to Stockport Road and the A5129 to Wilmslow. The traffic signals at Fountain Place created significant vehicular delay on all arms and only provided dedicated pedestrian crossing facilities across one arm of the junction.

The scheme has reduced the number of traffic lanes; all approaches are now single lane. Footways have been widened. The traffic signal controlled facilities at Fountain Place have been replaced with two informal roundels with courtesy crossings provided for pedestrians.

Among the case studies, the Poynton scheme handles the heaviest traffic volumes, with an excess of 25,000 vehicles per day passing through Fountain Place.

Kerbs have been maintained throughout the scheme. Kerb heights are generally 30 mm, this height being agreed by an access group which helped inform the design process.



There is a median strip running down the centre of the roads to assist pedestrian crossing. On London and Chester Roads, the medians are typically 1.5 m wide, and pedestrians feel protected by street furniture in the medians. On Park Lane, because of limited overall street width, the median is over-runnable. The carriageways are 3 m wide but have also been visually narrowed by stone setts against both kerbs, which encourage drivers to reduce their speed. The design of roads approaching the Fountain Place junction changes from 80 m to 100 m prior to the junction; this changes the mind-set of the drivers as they near the junction so that slower speed and more courteous behaviour are achieved. The phase 2 scheme is illustrated in Figure 1.

Informal crossing points are provided on each of the four arms of the Fountain Place junction as well as at various points along the approach roads; this is most evident on Park Lane.

The scheme has required some ongoing maintenance due to cracking of surfaces and movement of blocks in certain areas of the carriageway.



Figure 1 – Fountain Place Junction Layout (Drawing Image Provided by Planit IE)



Fountain Place

Before

After





Park Lane

Before

After





2. Technical Data

Dates	Construction: Phase 1, 2010–March 2011; Phase 2, 2011–Summer 2012
Cost	£5.3 million
Traffic Volumes	25,000 vehicles, including 2–3% HGVs, through Fountain Place junction daily. 2,400 vehicles in peak hour. 10,000 vehicles per day along Park Lane
Traffic Speed	Circa 20 mph
Pedestrian Volumes	Busiest individual crossing at Fountain Place - 70 per hour
Pedestrian Crossing Movements	Courtesy levels 65–95% entry/exit
Road Safety	In 3 years prior to the scheme, 14 reported accidents – 5 serious and 9 slight. In 3 years post-implementation, 9 reported accidents – 2 serious and 7 slight
Design Parameters	<ul style="list-style-type: none"> - Kerb height: 30 mm - Carriageway lane width: 3 m - Pedestrian crossing width: 3 m minimum - Median width where street furniture: 1.5 m, where over-runnable: 1.2 m



3. Evaluation of Performance

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

As part of the design process, consultation with residents and local traders was undertaken prior to the construction of the scheme. An access group was established to provide input into the design.

The scheme has footway and carriageway areas defined by 30 mm kerbs. Crossing points are considered conspicuous, and observations show that the vast majority of pedestrians use these crossing points.

The nature and frequency of the crossings and the adjacent footway widths mean that they are easily negotiated by people in wheelchairs or with prams or buggies.

Being courtesy crossings, no guidance is given to visually impaired people as to when it is safe to cross. There is currently little information on how vulnerable users are coping with these crossings. Cheshire East Council is soon to undertake a post-implementation review with the access group to gain such feedback.

Ease of Movement – Vehicles

As previously mentioned, the Fountain Place junction is heavily trafficked with 25,000 vehicles, including 2–3% HGVs passing through per day. Approximately 10,000 vehicles per day pass along Park Lane (main shopping street).

Traffic congestion has reduced since scheme implementation.

Surveys indicate that traffic volumes passing through the Fountain Place junction have reduced during peak periods. Prior to the scheme in 2008, 2,685 vehicles passed through in the p.m. peak hour. In late 2012 post-implementation, 2,286 vehicles passed through; and in 2014, this was 2,417 vehicles.

These changes in traffic volumes may not be a result of the scheme itself as in 2011, the nearby Woodford aircraft factory served from the Chester Road arm closed. The Chester Road entry into the junction is the arm with greatest flow reduction.

Vehicle flows along Park Lane are very similar now to those prior to the scheme construction.



Even though the number of traffic lanes at the junction, previously nine entry lanes across the four arms, has reduced to four (one per arm), congestion has lessened with the removal of the traffic signals.

Traffic delays on the A523 prior to the scheme implementation were in the order of eight to nine minutes at peak times with drivers taking several cycles of the signals to pass through the junction. Delays still occur but are now less than three minutes on the A523 at peak times. Queuing traffic along Park Lane, the primary shopping street, has been substantially reduced, now less than half its previous length.

The removal of traffic signals coupled with the other design features, such as narrowing of entry roads and removal of signs and markings, has resulted in traffic speed reductions. The average speed is now in the order of 20 mph. On Park Lane, speed has reduced by 6–7mph. The Cheshire East Council is due to resurvey vehicle speed in the near future.

Ease of Movement – Pedestrians

Previously, pedestrian crossing facilities in Poynton town centre were poor. The volume of traffic meant that crossing away from the junctions was difficult. At Fountain Place, pedestrian crossing facilities were only provided across one arm; across the other arm, only refuges were provided. A puffin crossing was the sole crossing along Park Lane and was situated midway along its length.

As a result, crossing times for pedestrians were long with an average delay to cross the A523 of 50 seconds and a maximum delay of 100 seconds.

Post-scheme implementation, courtesy crossings are provided at approximately 50-metre intervals along the roads. Drivers are typically courteous.

On the courtesy crossings at the Fountain Place junction, over 90% of drivers typically cede priority to pedestrians on their approach to the junction, with a courtesy rate of 65% from drivers exiting the junction.

As a result, pedestrian delay time is less than 10 seconds and, on average, less than 5 seconds. This combined, with the increased number of crossing points, has greatly improved pedestrian connectivity.

Although the statistics show great improvements in connectivity, the loss of formal, signalised crossings even though only in two locations is raised as an issue by some user groups.

Ease of Movement – Cycling

There is very limited data on the impact of the scheme on cyclists. Cyclists now have to travel at the speed of general traffic because of the narrow lane widths. Previously, they could potentially pass between the vehicles in the two-lane slow-moving queues; however, the road layout is simplified, and maximum traffic speed is lower than before the scheme implementation.



Improved Safety and Public Health

Information on reported accidents has been collected from the website crashmap.co.uk and is presented below. Cheshire East Council is soon to provide more detailed accident data. The maps show accidents on Park Lane and at the Fountain Place junction. There has been a decrease in the number and severity of reported accidents across the scheme as a whole in an equivalent number of years before and after scheme implementation.

In 3 years prior to the scheme (2007–2009), there were 14 reported accidents – 5 serious and 9 slight. In 3 years post-implementation (2013–2015), there were 9 reported accidents – 2 serious and 7 slight.

However, within this overall decrease in the number of accidents, there has been an increase in the number of accidents involving pedestrians from two (one serious, one slight) to six (two serious, four slight). The increase in pedestrian accidents is along Park Lane. There has been no increase along the A523.

Between these years, there has been a reduction in cycle accidents from five (two serious, three slight) to three (all slight).

No information is available on the wider health impacts of the scheme in terms of either changes in emission levels with reduction in scale of queuing of traffic or changes to scale of walking or cycling activity.

It is noted that Cheshire East Council is in the process of commissioning a post-opening report to review all aspects of the performance of the scheme against its original objectives.

Key for crashmap information:

Incident Severity

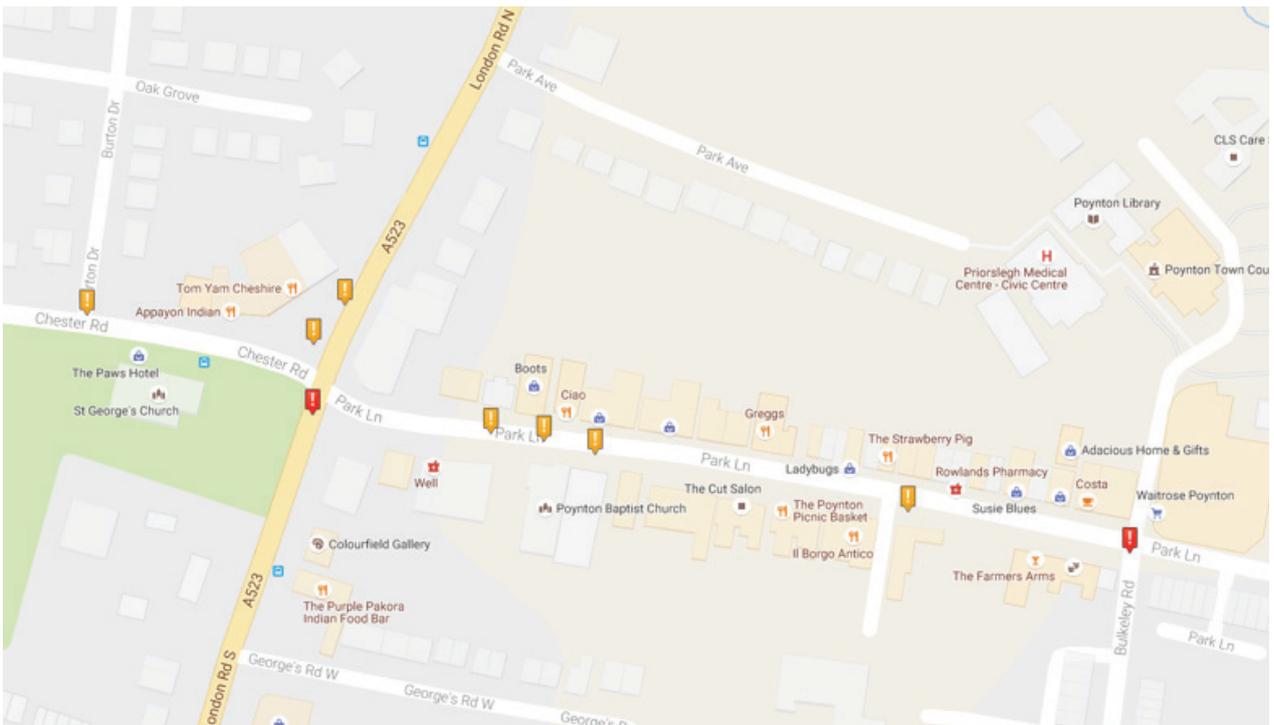


All Casualty Types:

Before Construction (2007–2009)



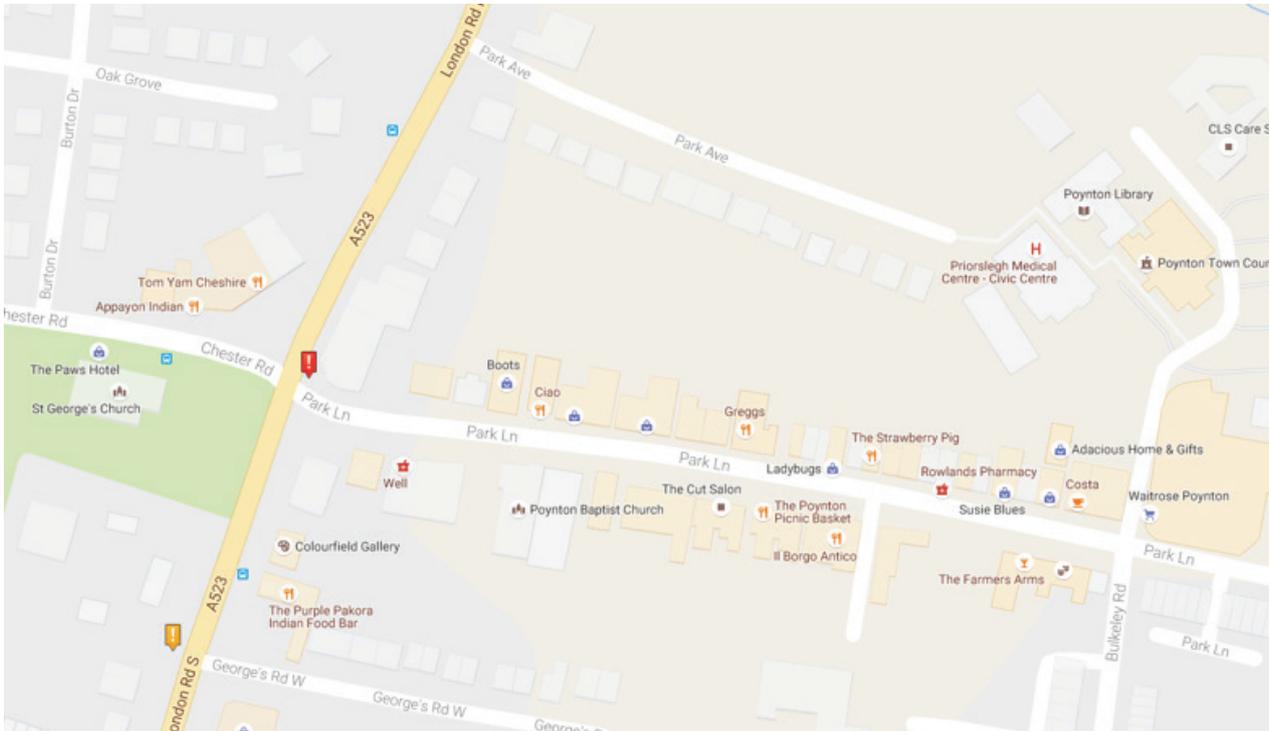
After Completion (2013–2015)



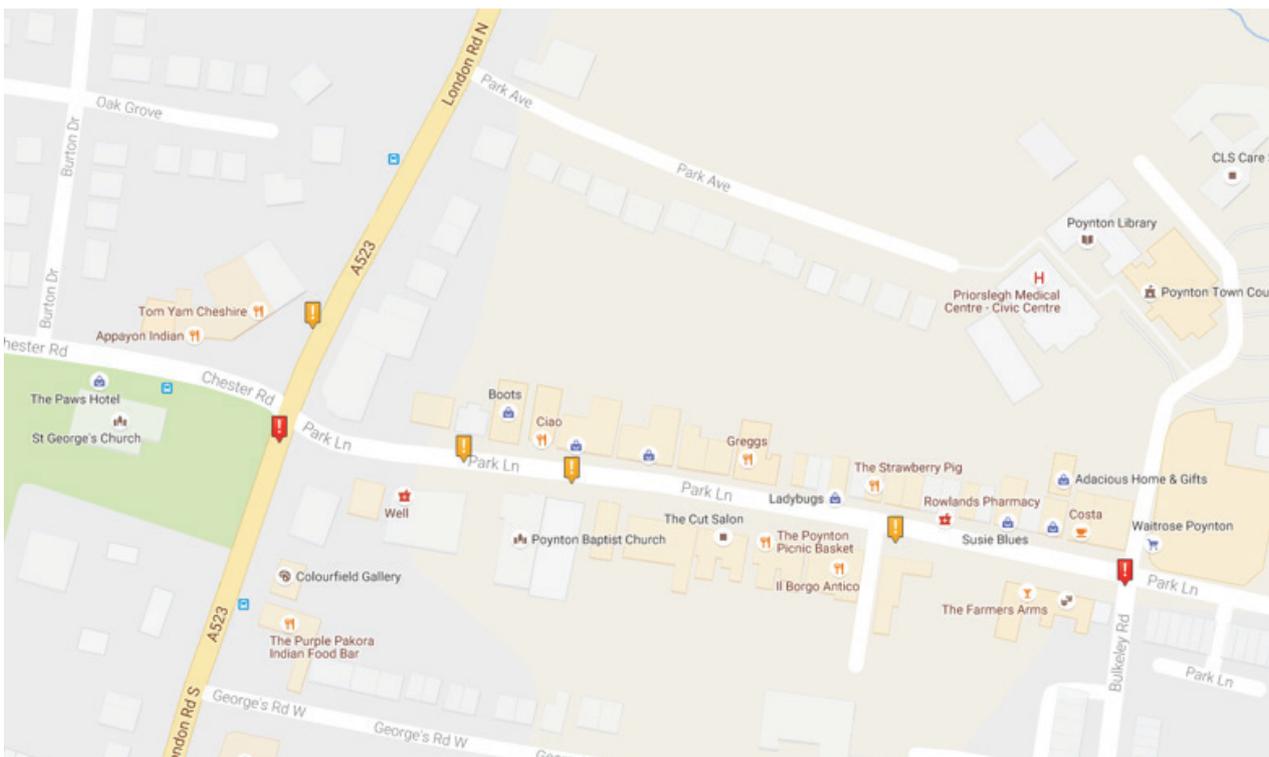


Pedestrian Casualties Only:

Before Construction (2007–2009)



After Completion (2013–2015)





Quality of Place

This scheme has used a range of natural stone paving with differing colour and tone.

The scheme also has a number of public art installations on approaches to the centre of the town, each of which represents a significant aspect from the history of the town (e.g., mining and aircraft building). Small steel markers have been added to the footway, each of which represents a different mining pit, hence preserving the local mining heritage.

The scheme has relocated the Jubilee Fountain in a greatly widened footway space also providing seating.

There has been an increase in outdoor seating from local businesses, such as cafes and restaurants, alongside the additional seating provided as part of the scheme.

Overall, it is considered the quality of the place has been greatly improved (see before-and-after photos).

Economic/Regeneration Benefits

Prior to the scheme implementation in 2010, there were 16 vacant retail premises on Park Lane. Post-implementation in 2013, there was only one vacant unit. This decreased vacancy rate indicates that the scheme has operated well as a catalyst for economic regeneration. Overall, the town centre has been rejuvenated. Eighty percent of retailers report increased footfall and turnover in the period following completion of the scheme. There has been a growth in small cafes/restaurants and alfresco dining along Park Lane.

It is noted, however, that at the same time as the implementation of the scheme, Waitrose opened a supermarket at the east end of Park Lane, and hence other factors also form part of the regeneration success.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Neutral

Little information on the success or otherwise of the scheme for people with mobility impairments is available. Wheelchair users and those with prams and buggies can move through the area with much greater ease. The impact of the scheme on visually impaired people is unclear. The monitoring to be undertaken by Cheshire East Council will help clarify the impacts in this area.

Ease of Movement

+ve

Pedestrian connectivity has been greatly improved but without detriment to vehicle delay or to cyclists. The number of crossing points has greatly increased, and the wait time at each has reduced. Vehicle speed has reduced. However, formal, signalised crossings have been removed at two locations, generating some concern. Vehicular congestion has reduced.

Improved Safety and Health

Neutral

There has been a reduction in the total number of reported accidents since the scheme implementation; however, the number of accidents involving pedestrians within this overall total has increased, whilst cycle accidents have decreased.

Quality of Place

+ve

A more attractive environment has been created. The scheme has created areas for activities, such as dining, sitting, and talking in the street. Footways have increased in scale and carriageway space reduced.

Economic/Regeneration Impact

+ve

The scheme is considered a success. Occupancy rates on Park Lane have greatly improved, and traders report increased footfall. This is important as the fundamental aim of the scheme was the reinvigoration of the town centre.



Case Study 6: Gosford Street, Coventry

Informal Street, Junction

1. Introduction

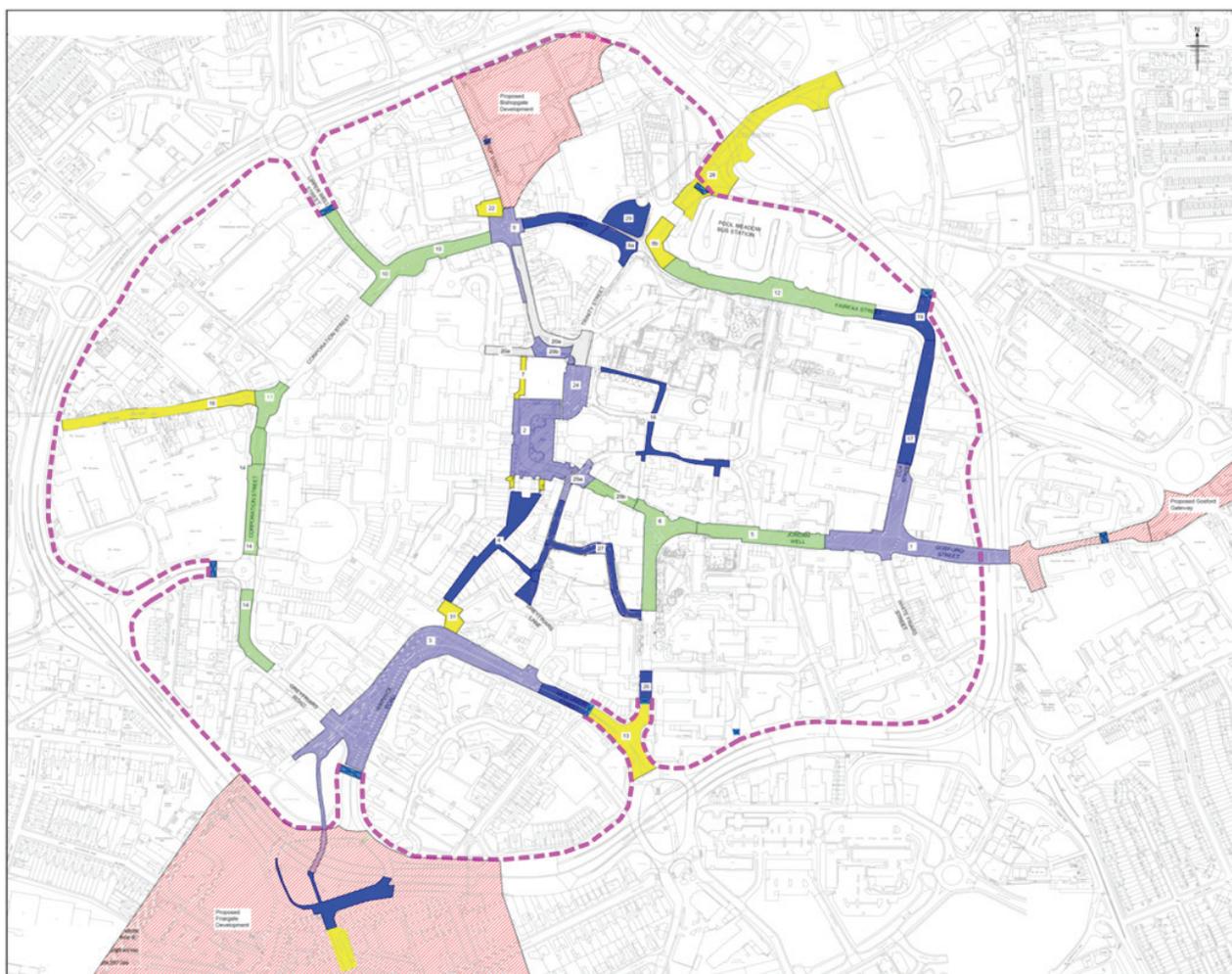
The Gosford Street/Cox Street junction improvement scheme was implemented in late 2011. It formed part of phase 1 of the Coventry City Centre Public Realm Project. This case study considers this junction improvement scheme in detail alongside providing information on the wider city centre project.

The overall project is a £16.6 million package of public realm improvement schemes across Coventry City Centre, the aim being to take a holistic approach to regenerating and 'traffic calming' the entire city centre. The overall project has been supported by the European Regional Development Funding (ERDF). The phase 1 schemes were implemented in 2011 and completed by summer 2012; this was a key year for Coventry to improve its image as several football matches were held in the city as part of the 2012 Olympic Games.





The schemes all lie within a combined 20 mph and restricted parking zone. The schemes sought to 'redesign the public realm with wider footways and new road layouts based on low speed environmental principles'. The works incorporated the 'decluttering' of the highway, including removal of unnecessary signs and street furniture. In some instances, this included the removal of traffic signals and, consequently, any associated signal-controlled pedestrian crossing facility. Where signal crossings were removed, works were undertaken to narrow the carriageway and encourage traffic to slow down. Courtesy or zebra crossings were provided in greater numbers as alternative crossings.





Aims of the Project

The following objectives and measures of success were set as part of the ERDF application process for the overall city centre public realm improvements:

Objective 1: To improve the attractiveness of Coventry City Centre by 2012 as a result of public realm and local infrastructure improvements

Success being measured by

- an increase of 50% in the number of businesses attracted to the city centre by 2015,
- a reduction of 15% in the number of vacant retail units by the end of 2015, and
- an increase of 10% in new planning applications in respect of city centre developments by 2015.

Objective 2: To improve the economic vibrancy of the city centre by June 2015

Success being measured by

- an increase in footfall of 8%,
- an increase in average visitor spend of 5%, and
- a reduction of 15% in vacant units within the city centre.

Objective 3: To improve the visitors' positive perception of Coventry City Centre by 5% by June 2015

Success being measured through an annual visitor survey.

Objective 4: To deliver a 20% uplift in the quality of the pedestrian environment

Success being measured by the TRL Pedestrian Environment Review System (PERS) pre- and post-improvements.

Objective 5: To provide a 5% increase in the number of repeat visitors to the city centre

Success being measured via annual visitor surveys over the following three years from the physical completion of the project.

Gosford Street/Cox Street Scheme Details

The Gosford Street/Cox Street junction improvement formed part of this overall design and thought process and being in an early phase has allowed sufficient time for its impacts to be studied.

The Gosford Street/Cox Street junction lies between the city centre and major elements of the university campus; hence, pedestrian flows are high. It also lies on one of the main bus arteries into the city.

The junction improvement implemented in late 2011 exhibits many of the features of the wider public realm project.



The junction was a typical urban traffic signal installation; the approach arms each had two or three traffic lanes. Congestion was an issue at the junction, especially on roads heavily used by buses travelling to and from the city's main bus station. No red/green figure pedestrian crossing facilities were installed at the traffic signals; hence, pedestrians had little priority in crossing the roads at the junction.

The improvement scheme removed the traffic signals and narrowed all approach arms to a single vehicular traffic lane in each direction. Footways were widened. Courtesy crossings were provided at the junction. Zebra crossings were provided across Gosford Street 50 m west and east of the junction and 90 m north of the junction on Cox Street.



Gosford Street/Cox Street Scheme



Gosford Street / Cox Street Junction

Before Situation:



After Improvement:



Pictures courtesy of Google Street view



Gosford St / Cox St After Photos





2. Technical Data

Dates	Implemented in late 2011																		
Cost	£875,000 funded by the Coventry University and City Council																		
Traffic Volumes	<p>Gosford Street (east of junction)</p> <ul style="list-style-type: none"> - Average weekday daily flow: 7,449 vehicles before (2011), 8,496 after (2014) - Average Saturday flow: 7,542 before (2011), 7,153 after (2014) <p>The busiest approach at the junction now carries circa 300–400 vehicles per hour</p> <p>Traffic volumes have increased post-implementation of the scheme</p>																		
Traffic Speed	<p>Speed surveys before (2008) and after (2011 onwards) have been undertaken by the city council on Gosford Street. These show an immediate reduction in speed of approximately 6 mph to 18 mph upon scheme implementation and an ongoing reduction in speed in recent years 2012–2014. This ongoing reduction in speed is reflected across the city centre as other public realm schemes have been implemented</p> <table border="1"> <caption>Traffic Speed Data (MPH)</caption> <thead> <tr> <th>Date</th> <th>85%ile Speed (MPH)</th> <th>Mean Speed (MPH)</th> </tr> </thead> <tbody> <tr> <td>Mar-08</td> <td>30</td> <td>25</td> </tr> <tr> <td>Nov-11</td> <td>23</td> <td>18</td> </tr> <tr> <td>Jun-12</td> <td>24</td> <td>19</td> </tr> <tr> <td>Jan-13</td> <td>20</td> <td>16</td> </tr> <tr> <td>May-14</td> <td>19</td> <td>11</td> </tr> </tbody> </table>	Date	85%ile Speed (MPH)	Mean Speed (MPH)	Mar-08	30	25	Nov-11	23	18	Jun-12	24	19	Jan-13	20	16	May-14	19	11
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Nov-11	23	18																	
Jun-12	24	19																	
Jan-13	20	16																	
May-14	19	11																	
Traffic Delays	Congestion at the junction has decreased following removal of the traffic signals, although traffic volumes have increased																		
Cycle Volumes	Circa 700 cyclists per day use Gosford Street (88 in busiest day prior to the scheme)																		
Pedestrian Volumes	Approximately 1,700 pedestrians cross at the junction in the busiest hour																		
Pedestrian Delays	Pedestrians are subject to little delay, typically less than 10 seconds, in using the courtesy crossings																		
Pedestrian Comfort	<p>The courtesy level at the courtesy crossings is low, circa 20%. The reasons for this are not fully understood. However, the courtesy crossings contrast with nearby zebra crossings; there are no medians, and there are zebra crossings in relative proximity to the junction where pedestrians have priority over vehicles with corresponding high levels of courtesy. Any of these factors may be key in influencing driver courtesy at the crossings immediately adjacent to the junction</p>																		
Kerb Height	40 mm																		



3. Evaluation of Performance

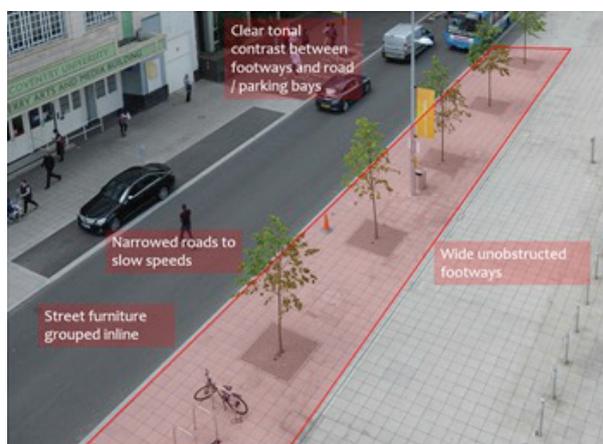
This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

The public realm improvements by the city council were designed in consultation with a dedicated focus group formed of key representatives from the Access Development Group, which is a subpanel of the Disabilities and Equalities Advisory Panel. The consultation was undertaken to ensure the design was as inclusive as possible for all users, particularly visually impaired people, where the designs have sought to mitigate, where possible, the loss of tactile cone and push-button facilities at certain junctions across the city centre. It is noted that no such tactile or push-button facilities were in place at the Gosford Street/Cox Street junction.

Equality impact assessments were undertaken on both phase 1 and phase 2 schemes. The relative merits and perceived safety benefits of signal-controlled crossings over zebra crossings were discussed specifically by the Disabilities and Equalities Advisory Panel. The outcome was that zebra crossings were considered the appropriate design solution but with several additional measures introduced to mitigate adverse impacts.



A note on the Coventry City Council's considerations of the relative merits of zebra crossings versus signalised crossings is attached with this case study.

The Coventry City Council considers the zebra solution as an integral part of the overall design solution to provide an age-friendly city, the key components being

- narrower road widths with slower vehicle speed;
- more controlled (zebra) pedestrian crossing points with very short crossing distances;
- increased disabled on street parking provision;
- wider, unobstructed footways;
- additional seating areas;
- removal of subways and steep footway gradients; and
- introduction of kerbs at shared space schemes to form segregated footways.

The city council acknowledges that zebra crossings do not provide the positive guidance to visually impaired people that signalised crossings provide but considers they are the optimum form of crossing within the overall design palette. To assist visually impaired pedestrians within the new public realm environment, the city council, in collaboration with Siemens, is currently trialling technology solutions to provide guidance to the visually impaired as to whether cars are stopped or moving at the crossing, with the information being provided via an app which vibrates the user's smartphone at different rates on the user's phone, depending upon whether vehicles are stopped or moving.

Ease of Movement – Vehicles

Vehicles travel slowly on the approaches to the junction, less than 20 mph, but are subject to only limited delay at the junction. Queuing is less prevalent than it was when the traffic signals were in place.

The four approach arms are offset, and a central diamond has been laid down. No guidance is given as to vehicle priorities.

Unlike many other schemes elsewhere in the UK where orbital design patterns have been used in the carriageway, which encourage drivers to treat a junction as a roundabout and give way to the right, the diamond configuration provides no guidance as to who has priority. A range of driver behaviours has been observed at the Gosford Street/ Cox Street junction, primarily a 'first come, first served' behaviour but sometimes a 'main road (Gosford Street)/side road (Cox Street)' behaviour.

The layout and consequential uncertainty in driver behaviour greatly slows traffic but does not create significant delay. Approximately 800 vehicles per hour pass through the junction in the busiest hour.





Ease of Movement – Pedestrians

The majority of pedestrians cross at the junction at or near the courtesy crossings provided at the junction. Drivers are not typically courteous at these crossings, and pedestrians have to wait for gaps; force their way across, making drivers cede priority; or wait for a courteous driver. With a courtesy rate of 20%, approximately one in every five drivers does stop for pedestrians.

The Gosford Street/Cox Street scheme does not have central medians requiring pedestrians to negotiate with traffic in both directions. This makes crossing somewhat more difficult, and sometimes pedestrians wait in the centre of the road to find a gap in the traffic on the far side of the road.

The zebra crossings relatively close to the junction provide an alternative route with priority for pedestrians over traffic for those who are uncomfortable in crossing at the junction. The use of the zebra crossings does incur an additional walk distance for certain trips.

The scheme provides improved ease of movement for pedestrians compared with the previous traffic signal arrangement since no dedicated facilities were provided for pedestrians at the signals, and there was no courtesy from drivers.

Ease of Movement – Cycling

No information is available on how cyclists view the implemented scheme compared with the previous scheme.

Improved Safety and Public Health

Coventry City Council, as part of their monitoring, has undertaken a detailed before-and-after road safety analysis. They have provided an analysis of safety impacts across the overall area of the Gosford Street scheme and also at the immediate junction.

Gosford Street Scheme Area Overall - Casualties vs. Severity

	Before (5yrs)	After (3yrs)
Fatal	1	0
Serious	3	1
Slight	22	6
Pedestrians	12	4
Total	26	7



Gosford Street Immediate Junction Only - Casualties vs. Severity

	Before (5yrs)	After (3yrs)
Fatal	0	0
Serious	3	0
Slight	7	0
Pedestrians	6	0
Total	10	0

For the overall Gosford Street scheme (not citywide) five-year (01/09/2006 to 30/08/2011) period prior to the substantial completion of the scheme, there were a total of 20 recorded injury accidents resulting in 26 casualties, 4 of which resulted in serious injury.

The recorded injury accidents for the 36 months after the completion of the scheme (01/10/2011 to 30/09/2014) for the full scheme area shows there have been 7 casualties post-opening of the scheme, one of which resulted in serious injury. The remainder were all slight injuries.

A 'before' rate of 5.20 casualties per annum compares with an 'after rate' of 2.33 casualties per annum.

On closer examination of the seven recorded injury accidents occurring post-completion for the wider scheme area, the collision analysis showed a small cluster of collisions at the junction of Cox Street and Fairfax Street, albeit no identifiable pattern to the individual collisions is apparent.

A further two collisions are random by nature; one included a child passenger on a bus failing off their seat, and the other was a car clipping a pedestrian whilst manoeuvring into an on-street parking bay.

Focusing on the Gosford Street/Cox Street junction in isolation, the previous road layout saw 10 casualties recorded in 5 years at or within the previous junction layout, 3 of which were serious injuries, and 6 of the collisions involved pedestrians being struck by vehicles. Post-completion, there have been no recorded injury accidents. The 'before' casualty rate being 2.0 per annum compared with an after rate of zero.

Overall, the scheme is considered to have had a beneficial impact in terms of safety. In respect of the impact of the scheme on wider public health due to changes in emissions or walking/cycling activity no information has been sourced.



Quality of Place

There have been significant improvements to the attractiveness and quality of the public realm (see before-and-after photos). Footways are much wider. Street clutter, including traffic signals, has been removed. Trees have been planted.

The quality of materials used has been relatively modest; however, overall, the quality of place has been greatly improved.

Economic/Regeneration Benefits

As noted earlier, objectives and measures of success were set as part of the European funding application, including economic or regeneration. In respect of economic/regeneration impacts, the findings are as follows:

Objective 2: To improve the economic vibrancy of the city centre by June 2015

Interim results to date:

- Footfall down at 2.9% compared with target increase of 8%. This is disappointing given the number of high-profile events held in Coventry during 2012; however, Coventry's decline in footfall is less than the national decline of 3.2% over the same period.
- Visitor spend increased by almost 1% between April 2011 and April 2012 against long-term targets of 5%.
- There has been a slight increase in the number of vacant retail units, with an average of 44 between April 2011 and April 2012 and 49 between April 2012 and December 2013 compared with target reducing by 15% by 2015.
- Thirty-one new businesses attracted to the city centre (April 2011 to December 2013). This is an upward trend in number of new business being attracted into the city centre (above target).
- A 30% increase in the number of new planning applications (mostly minor) (on target).
- A 2% increase in the number of repeat visitors to the city centre from April 2011 to April 2012 (on target).

The Coventry City Council considers the early results are extremely positive in terms of their impact within Coventry City Centre. The number of new businesses and jobs created has already passed the targets set. They note, however, that while these results cannot be directly attributed to the public realm improvement in Coventry, it is evident that there is investor confidence in Coventry, which is critical to create an economically vibrant future for the city.

Overall, it is considered the city centre public realm schemes, of which the Gosford Street/ Cox Street scheme is a component part, are delivering economic and regeneration benefits to the city.



4. Conclusions

A summary of the impacts of the Gosford St / Cox St scheme for each of the five evaluation headings is as follows.

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

+ve	-ve
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The Coventry City Council has adopted the combination of zebra and courtesy crossings to replace traffic signals across the city centre as part of age-friendly design principles, which reduces vehicle speed and provides narrower carriageways with kerbs and more controlled crossing locations. Their analysis, after completion of equality impact assessments, is that this is the most inclusive design solution. Some visually impaired people still consider the solution unsatisfactory. To minimise this impact, the council is trialling technological solutions providing information on movement of vehicles at the zebra crossings.

Ease of Movement

+ve

Pedestrian connectivity has been improved but without detriment to vehicular delay. Pedestrians previously had no positive guidance as when to cross but had narrow refuges in the centre of the carriageway at Gosford Street. Traffic was not courteous to pedestrians. Courtesy crossings are now provided at the junction, although courtesy at the crossings is low. Zebras are available within 50 metres of the junction. Overall, it is considered movement by all modes is easier following implantation of the scheme. Vehicle delays and speed have reduced. Overall, it is considered that the Gosford Street/Cox Street scheme has made it easier for both pedestrians and motorists to pass through the space.

Improved Safety and Health

+ve

There has been a reduction in casualties at the Gosford Street/Cox Street junction.

Quality of Place

+ve

A more attractive environment has been created at Gosford Street but, more particularly, across the wider city centre. Footways have increased in width; carriageway space has been reduced. Tree planting has been implemented, and other street furniture have been provided. Overall, it is considered the quality of the place has been greatly improved.

Economic/Regeneration Impact

+ve

Information shows that the overall scheme across the city centre is having a positive economic impact.



Appendix to Case study 6: Signalised Crossings vs. Zebra Crossings based on Coventry City Council Cabinet report 22nd January 2013

There is debate about the relative merits of signalised crossings vs. zebra crossings. Often in the past, the dominant factor determining the choice of crossing type was the impact on traffic delay; however, inclusivity, pedestrian connectivity and safety are key considerations in the decision-making process determining the most appropriate crossing type.

The choice of signalised crossings or zebra crossings was a particular issue for the Coventry Public Realm Project. The project proposed the removal of a number of signalised pedestrian crossing facilities and replacement with controlled 'zebra' crossings. The Coventry City Council undertook a detailed review and prepared a detailed cabinet member report specifically on this matter. This note details this process and the findings of the Coventry City Council.

The report was prepared following an objection to the removal of signalised pedestrian facilities by the National Federation of the Blind in the United Kingdom.

After undertaking an equality impact assessment on the phase 2 works of the public realm project, the response to the objection was as follows:

Signalised pedestrian crossings do provide a controlled environment for crossing the road with a physical indication, in the form of rotating tactile cone, provided to advise a visually impaired pedestrian when to cross. A review of injury collisions within the City Centre prior to the commencement of the Public Realm works has shown in a 5 year period, 16 injury collisions occurred at the 8 zebra crossings and 23 injury collisions occurred at 6 pelican/puffin crossings, this is a lower ratio of injury collisions at zebras compared to stand alone signalised crossings. The proposed removal and changes to the controlled facilities at locations 1, 2, and 3 has been carefully considered and additional works such narrowing carriageways and widening footways are being undertaken to reduce vehicle speeds on approach, and ensure pedestrians only have to cross short distances and where possible only one direction of traffic flow at a time. Following consideration of the response the recommendation is to continue with the changes to the controlled crossings.

In coming to these recommendations, the report noted that the proposals had been discussed at the council's Disabilities and Equalities Advisory Panel and that the proposed scheme had been designed in consultation with a dedicated focus group formed of key representatives from the Access Development Group to ensure the design was as inclusive as possible for all road users, particularly the visually impaired, and to mitigate, where possible, the loss of the tactile cone and push-button facility.

It was noted that all designs will be road safety audited at various stages during design. Road safety audits would also be undertaken on completion of the scheme. In addition, stage 4 road safety audits (undertaken once a scheme has been in operation for approximately one year) would be undertaken.



The report noted that the changes in crossing type form part of the proposed public realm works. These works, which are in a reduced speed limit (20 mph) within the city centre, increase some footway widths; provide additional controlled crossings; create additional street parking, including more disabled parking bays; and have reduced the volume of traffic utilising High Street, which will have a positive impact on the safety of all pedestrians in these areas.

The proposed changes to the type of crossing facility, from traffic signal controlled to a zebra, at locations 1 and 2 will retain a central refuge but also include changes to the width of the road to be crossed; this will be of benefit for people with walking difficulties and wheelchair users. Furthermore, tactile paving will be provided to assist the visually impaired to locate the crossing points.

Location 3 is a proposed new controlled zebra crossing.

The council considered the implications of the Equality Act in the choice of zebra crossings vs. signalised crossings. Their report included the following:

Section 20(3) of the Equality Act 2010 states: '...where a provision, criterion or practice of [the Council] puts a disabled person at a substantial disadvantage in relation to a relevant matter in comparison with persons who are not disabled [the Council is required] to take such steps as it is reasonable to have to take to avoid the disadvantage...' In view of the comments above, the Council does not feel that the proposed scheme will put any disabled person at a 'substantial disadvantage' in comparison with the current situation. The comments above also demonstrate how the Council has had regard to its duties under Section 149 Equality Act 2010, particularly the need to provide equality of opportunity between disabled persons and others and to take account of disability issues in developing the scheme.

Following the above, the recommendation of the city council was to implement the necessary highway changes, which replaces many signalised crossings with a combination of zebra and courtesy crossings alongside reductions in carriageway width, widened parking, and revised parking and servicing arrangements.



Case Study 7: Kimbrose Triangle, Gloucester

Informal Street

1. Introduction

Kimbrose Triangle is situated in Gloucester City centre. It lies on the main pedestrian route between the city centre and Gloucester Quays, a mixed-use regeneration area comprising retail, office, leisure and residential uses.

Kimbrose Triangle is part of a wider scheme that also includes changes to surrounding roads, such as Southgate Street. This case study focuses on the triangle area itself.

At Kimbrose Triangle, pedestrians moving between the city centre and the Quays are required to cross the A4301 Commercial Road, which is effectively the Inner Ring Road for the city. Previously, pedestrians crossed at a set of traffic signals with pedestrian phases. To cross to the Quays required the use of two signalised crossings with a central island in between. The quality of the space, the nature of the crossings, and the time taken to cross the road were considered to be causing severance between the city centre and the expanding Quays area. Southgate Street leads into the city centre from Kimbrose Triangle and forms part of a gyratory on the A4301. The scheme also sought to remove all through traffic along this street.

At Kimbrose Triangle, a shared space scheme was implemented in spring 2011, including making the A4301 two-way with removal of general traffic from Southgate Street. Minor amendments to the scheme were made in autumn 2011. The scheme along the A4301 incorporates a 350m length of carriageway with a 20 mph speed limit.

The scheme is a level surface. Footway and carriageway areas are not separated by a kerb. There is a clearly defined vehicle carriageway delineated by differing colour and texture of materials for footway and carriageway areas with contrasting channel blocks between the two. Bollards are also used in certain areas.

Originally, the 2011 scheme had no identified crossing points for pedestrians, with the intention being that they could cross the carriageway at any location; however, the nature of the crossings or lack of them across the A4301 caused ongoing public debate.



Following a petition in 2014, the county council undertook a data collection exercise and engaged in a consultation process with the Road Safety Partnership and other affected consultees. The desired position of the council was to improve the situation with regard to crossing Commercial Road whilst retaining the area's shared space scheme. This led to the decision to add a conspicuous courtesy crossing across Commercial Road together with corduroy guidance strips on the approaches rather than a full zebra or signalised control crossing. The crossing is not a lawful zebra, having neither Belisha beacons nor zigzag markings. The modifications were installed in autumn 2015.

The 2015 scheme provided a focal point for pedestrians to cross and clearly indicated such provision to drivers.

This case study considers both the 2011 and 2015 schemes and how the modifications to the scheme changed both driver and pedestrian behaviour at the triangle.



2011 Scheme



2015 Revised Scheme

Aims

- to remove the severance generated by traffic along Commercial Road and improve the pedestrian connectivity between the city centre and the Quays,
- to transform the quality of the Kimbrose Triangle and to provide a sense of place where people will dwell and socialise, and
- to enable general traffic to be removed from Southgate Street, a retail street leading into the heart of the city



Scheme Location



Kimbrose Triangle Scheme as now in place







2. Technical Data

Dates	Construction lasted 10 months. Scheme opened in 2011
Cost	£5.4 million (including the central piece of art)
Traffic Volumes	Daily flow on the A4301 of 39,600 vehicles, with 5,800 in the a.m. peak period (0600–0900)
Vehicle Speed	Post opening: average 22 mph, 85th percentile of 27 mph
Traffic Delays	Post 2011, little or no traffic delays, except because of blocking back from traffic signal junction to south of the scheme in p.m. peak period. Post 2015, courtesy crossing generates some short duration transient queues at peak times
Pedestrian Volumes	Increased number of crossing since opening in 2011 as a result of significant ongoing development within Gloucester Quays
Pedestrian Delays	Prior to the 2011 scheme maximum, crossing times were in excess of 1 minute. With 2011 scheme, the average crossing delay was circa 5–6 seconds with maximum delay of 20 seconds. Post implementation of the 2015 scheme, the average pedestrian crossing delay reduced to 2–3 seconds and maximum delay of 5–6 seconds
Courtesy to Pedestrians	The courtesy level has been transformed with the 2015 implementation of the conspicuous crossing to 97%. The 2011 scheme previously had a courtesy level of only 15%
Kerb Heights	No kerbs
Signing	A variety of signing is provided on approach to scheme, and some pedestrian warning signs are provided within the scheme







Before and After Imagery

Pre-2009:



Pre-2009:



Post-2011:



Post-2011:



Post-2015:



Post-2015:



Pictures courtesy of Google Street view



Before and After Imagery

Pre-2009:



Pre-2009:



Post-2011:



Post-2015:



Post-2015:



Pictures courtesy of Google Street view



3. Evaluation of Performance

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

The scheme has meant the removal of the signalised red/green figure pedestrian crossing together with tactile facilities at Kimbrose Triangle.

The 2015 modification to the scheme was designed with input from a range of stakeholder groups, including visually impaired people, attending and inputting into the Road Safety Audits. The courtesy crossing is now easily located by the provision of guidance tactile bars extending to the building line on either side of the road. The edge of the carriageway at this location is also detectable. The courtesy crossing was considered acceptable by the stakeholder groups.

Adverse comments have been made by local visually impaired people about the design of the scheme but no data is available on the usability of the scheme by people with mobility impairments. The crossing behaviourally acts as a zebra crossing, allowing pedestrians to readily cross the road with drivers ceding priority and the surface being level. The route is now direct. Previously, such users had to cross the road in two stages and negotiate guardrails.

Ease of Movement – Vehicles

The scheme initially implemented resulted in little courtesy being offered to pedestrians by drivers and created little delay to traffic along the A4301. Previously, there was queueing as a result of the traffic signals.

Traffic levels in the first few months post implementation grew by 8%. It is not known whether this was as a result of the scheme or the result of ongoing development with the Quays.

Since 2015, with the implementation of the courtesy crossing, driver behaviour has changed dramatically with drivers now being highly courteous to pedestrians. As a result, some short duration traffic queues build up on the A4301 at peak times from the crossing; however, the crossing is not considered the constraint on traffic capacity along the A4301 route, the conventional traffic signal junction to the south of the scheme being the constraint on overall route capacity along the A4301.

In respect of the traffic junction within the scheme at Commercial Road/Parliament Street, no guidance is given to motorists as to priorities, but in practice, it predominantly operates as a main road/side road priority junction, Parliament Street being the side road.



Ease of Movement – Pedestrians

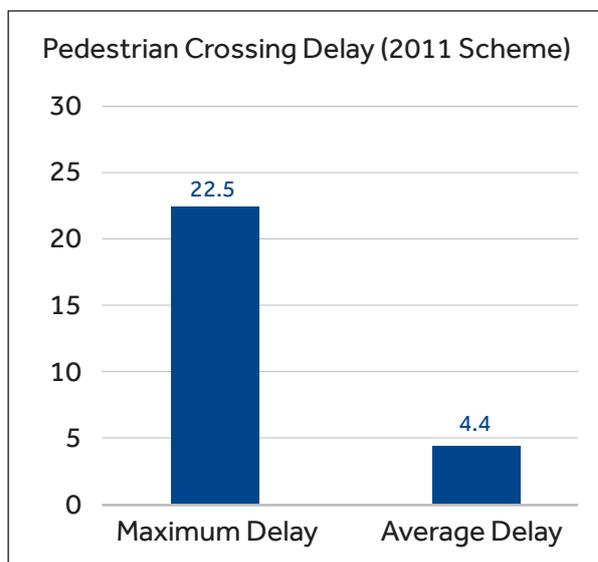
How pedestrians crossed Commercial Road was an issue after the implementation of the schemes in 2011. Both pedestrians and drivers alike continued to raise concerns about the uncertainty as to priorities and difficulties in crossing the road. Surveys indicated that only 15% (approximately 1 in 7 drivers) ceded priority to pedestrians.

Given the levels of traffic and interruptions in flow due to junctions up and down downstream, there were sufficient number of gaps that even at this level of courtesy delays to pedestrians were modest, typically less than 10 seconds, and were much less than with the previous signalised crossings. These ongoing concerns culminated in a petition being sent to Gloucestershire County Council in 2014. As a result, the county council undertook a consultation process, with input from a range of stakeholders, particularly visually impaired people.

As a result of the consultation, changes were made to the scheme in 2015. A courtesy crossing was installed in the heart of the scheme.

Stripes have been laid across the carriageway, but no Belisha beacons or zigzags are provided, and hence the crossing is not a lawful zebra; however, both drivers and pedestrians treat the crossing as a zebra, with courtesy rates now in excess of 97% compared with 15% previously. As a result, pedestrian delays have reduced, with now little or no delay in crossing the road.

The installation of the courtesy crossing has focussed pedestrian routes across Commercial Road to this location.



Post 2015: Courtesy Crossing



The courtesy crossing does slow motorists and creates some gaps in traffic to enable pedestrians to cross elsewhere within the scheme; however, there is now only limited pedestrian crossing of the A4301 at other locations within the scheme. At other locations within the scheme, drivers show less courtesy to pedestrians.

At either end of the shared space scheme, formal crossing points are provided to assist pedestrians.

Ease of Movement – Cycling

Little or no information is available on the impact of the scheme on cyclists.

Improved Safety and Public Health

A seven-day ATC speed survey was carried out by Gloucester County Council (GCC) at Kimbrose Triangle in 2015. The average speed recorded was 22 mph and the 85th percentile speed 27 mph. This area is a designated 20 mph zone; hence, the evidence is that the majority of drivers are travelling above the speed limit. This may be as a result of the relatively short length of the scheme and the width of the carriageway.

Before and after accident data is summarised below. In the four-year period before the scheme, 2007–2010, there were three reported slight accidents within the scheme area, and in the four-year period after, 2012–2015, there was one serious accident. None involved pedestrians in the before period, 2007–2010. The one serious post-implementation accident did involve a pedestrian. The pedestrian accident was not in Kimbrose Triangle itself but on one of the streets leading into the city centre. Between 2007 and 2010, there was one accident involving a cyclist; post-implementation, 2012–2015, there have been no reported cycle accidents.

A detailed safety audit on the modifications implemented in 2015 was undertaken, in particular considering the design of the courtesy crossing. The audit notes that such a design is unusual and that GCC would not normally advocate this layout but the courtesy crossing is on a commonly used desire line at Kimbrose Triangle and makes the presence of pedestrians to motorists more obvious. GCC notes that a full zebra crossing would not support the aims of shared space in general.



Key for crashmap information:

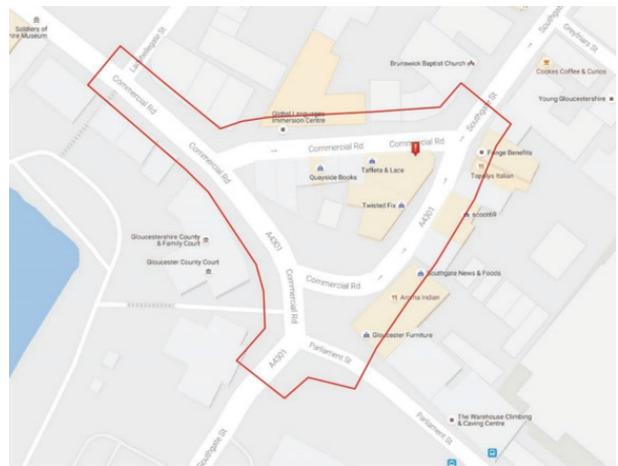
Incident Severity



All Casualty Types:
Before Construction (2007-10)



After Completion (2011-15)



Pedestrian Casualties:
Before Construction (2007-10)



After Completion (2011-15)





Pedal Cycle Casualties: Before Construction (2007-10)



After Completion (2011-15)



Quality of Place

The footways have been greatly widened. Trees have been planted, and numerous seats are now provided within Kimbrose Triangle. The vast majority of traffic has been removed from Southgate Street.

There is a piece of artwork in the centre of the scheme that extends 16.2 m vertically and is titled St. Kyneburghs Tower. The artwork helps create a stronger sense of place.

The scheme has removed traffic signals and some guard railing.

Overall, it is considered the scheme has greatly improved the quality of the place.

Economic Benefits

Little or no information is available on the economic/regeneration impacts of the scheme. There has been considerable development on the Quays since 2011, but what influence the scheme has had on this development is unknown.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

+ve	-ve
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For those in wheelchairs, on mobility scooters, or with buggies and prams, the scheme is considered highly beneficial. The post-2015 scheme is a considerable improvement for people with visual impairment. The courtesy level has been transformed with users being guided to a particular crossing point. However adverse comments continue to be made by some visually impaired people as to the design of the scheme.

Ease of Movement

+ve

Pedestrian connectivity has been greatly improved without detriment to vehicle delay. Vehicle delays and journey times are no worse than with the original pre-2011 gyratory system.

Improved Safety and Health

Neutral

There have been few accidents in the scheme area both before and after scheme implementation. There were two slight accidents before, one serious after.

Quality of Place

+ve

A more attractive environment has been created. The scheme has created areas for activities. Footways have increased in scale and carriageway space reduced. A significant sculpture adds to the sense of place. People are dwelling within Kimbrose Triangle, and more seating is provided and is being used.

Economic/Regeneration Impact

Insufficient information

Little information is available.



Case Study 8: Fishergate, Preston, Lancashire

Informal Streets, Links and Junction

1. Introduction

The Fishergate Central Gateway scheme, partially funded by the European Regional Development Fund, has transformed the appearance and operation of the traditional main shopping artery in Preston City Centre, Church Street, and Fishergate. These streets also provide the link between the city's bus station and rail station.

The scheme extends over a length of 800 m. It is being constructed in phases. Phase 1, from Winckley Street to Pitt Street (350 m), was completed in December 2014; and Phase 2, from St. John's Place to Winckley Street (450 m), was completed in autumn 2016. Phase 3 is yet to start.

Prior to the scheme, there were typically two, sometimes three, traffic lanes along these streets, with, in places, narrow footways. There were four signalised crossings and a significant amount of signing, guardrail, and general street clutter. This resulted in a poor environment with poor pedestrian connectivity and often crowded footways. The quality of the pedestrian facilities was considered by the city council to be having a negative impact on the performance of the retail units along Church Street and Fishergate.

The Central Gateway scheme has sought to transform the appearance of the street and its operation. The scheme has introduced a single lane vehicular carriageway with considerably wider footways over the majority of the 800 m length of the scheme. At either end of the scheme, two-way traffic remains, with each direction of traffic being in a single lane with a central median strip between the lanes.

Footway and carriageway areas are clearly differentiated. A 40 mm kerb separates the vehicular carriageway from the footways. The kerb-to-kerb carriageway width is 3 m along the central single lane section. The carriageway is further visually narrowed by provision of 450 m channel blocks within this width.

All traffic signals have been removed, no guidance is given as to vehicle priorities at junctions, and courtesy crossings are provided at approximately 40 m intervals along the length of the streets.

Corporation Street, between Fishergate and the A59 Inner Ring Road, has also been transformed as part of the Central Gateway project. The carriageway materials used in Corporation Street are different from those in Fishergate, courtesy crossings are lesser in number, and this street is more transitional in nature.

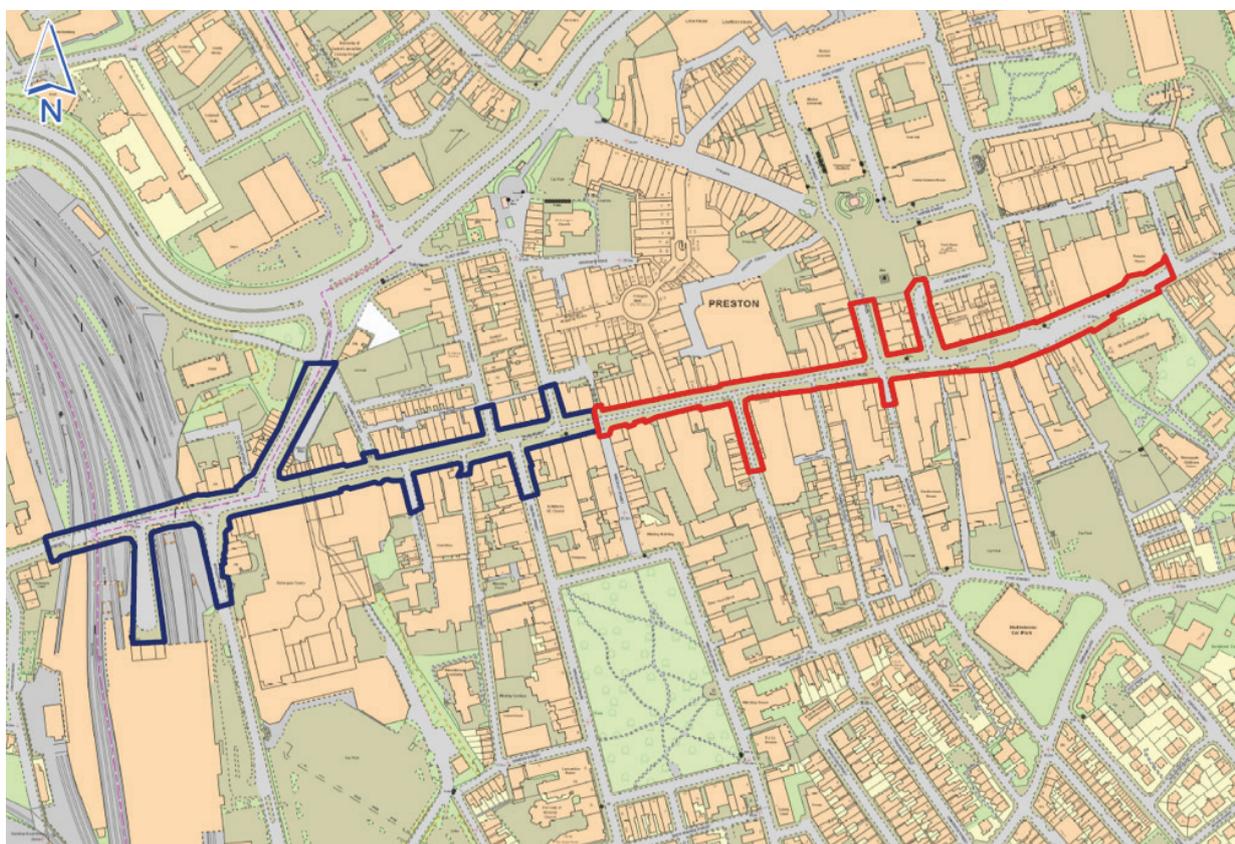


Aims

The primary aim of phase 1 of the scheme was to improve the gateway from the Railway Station and improve the pedestrian connectivity along Corporation Street to the north side of Ringway. Phase 2 and Phase 3 (not yet started) will then provide the better pedestrian environment that links the railway station to the bus station. The scheme has sought to make Church Street and Fishergate an enjoyable place to socialise, dwell and shop. By improving these streets as part of other wider city centre improvements, the city and county councils hope to attract investment and new businesses into the city.

The scheme has not sought to pedestrianise these shopping streets but to better manage traffic impacts and provide much greater space for pedestrians. It was considered the streets still required a vehicular movement function for the following reasons:

- On-street servicing is required for a number of properties.
- The street provides a key element in the city centre bus network, providing the link to the west of the city from the bus station via the rail station.
- The streets provide access to commercial/residential areas immediately south of the scheme.



Extent of Fishergate, Phase 1 (blue) and Phase 2 (red) Schemes

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Phase 1

Before:

After:



Images courtesy of Google Maps Streetview



Phase 2

Before:

After:



Images courtesy of Google Maps Streetview



2. Technical Data

Dates	Phase 1 – Completed December 2014 Phase 2 – Completed autumn 2016
Cost	Circa £3.4 m, £1.38 m of funding provided by the European Regional Development Fund, remainder provided by the Lancashire County Council (LCC)
Traffic Volumes	Post-implementation, in the busiest hours, 600–650 vehicles per hour travel along the single lane central section of Fishergate. At the western boundary of the scheme on Fishergate Hill at Pitt Street, traffic volumes are in the order of 950 vehicles per hour (12,000 per day) Volumes post and prior implementation are similar
Traffic Speed	Fishergate (central section) – Average 13 mph, 85th percentile 18 mph: Fishergate Hill (west end) - Westbound (exiting scheme) Average 20 mph, 85th percentile 24 mph; - Eastbound (entering scheme) Average 24 mph, 85th percentile 27 mph; Corporation Street (southbound) – Average 19 mph, 85th percentile 22 mph, max 30 mph
Traffic Delays	Exit from Fishergate westbound at Corporation Street – Average 12 seconds, a.m. peak, 20 seconds, p.m. peak Exit from Butler Street – Average 21 seconds, a.m. peak, 23 seconds p.m. peak
Pedestrian Volumes	20,000 per day (0700–1900) along Fishergate footways (both sides) at Mount Street 2,000 per day (230 per hour) crossing Fishergate south of Corporation Street
Pedestrian Delays	Delays are typically 10 seconds or less on average at any crossing. The figure below identifies crossing times in 2015 (including walk time at several locations)

Crossing Duration (both directions)

Crossing Point Area	Average AM peak (seconds)	Average PM peak (seconds)
Lune Street	7	8
Chapel Street	8	7
Butler Street	9	8
Corporation Street	12	12
East of Butler Street	10	8
East of Chapel Street	6	4
Pitt Street	8	10

At Pitt Street, more recent delay surveys (October 16) show average delays crossing Fishergate of 12 seconds, but at peak times, the maximum wait time observed was 1 minute 8 seconds



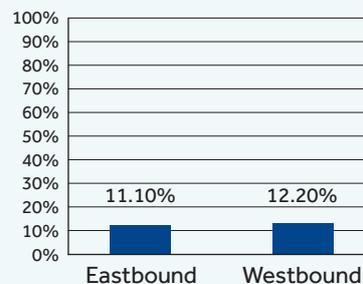
Courtesy

Courtesy rates at the pedestrian crossings are low compared with certain schemes of this nature elsewhere in the UK

Across Fishergate at Corporation Street:

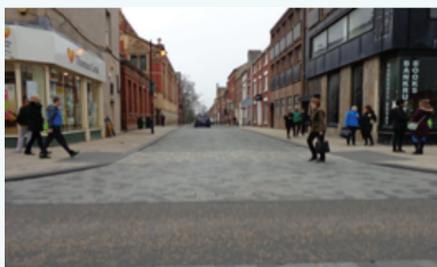


Courtesy - Corporation Street

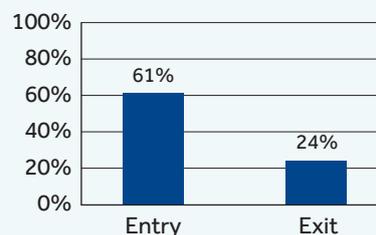


The area highlighted in the paving for the courtesy crossing is long, circa 30 metres. The lack of a highly conspicuous crossing point for pedestrians may be one of the factors leading to a low courtesy level of between 11% and 12%. The appearance of the crossing and the nature of the approach roads may also be leading to the low courtesy figures

Across Chapel Street:



Courtesy - Chapel Street

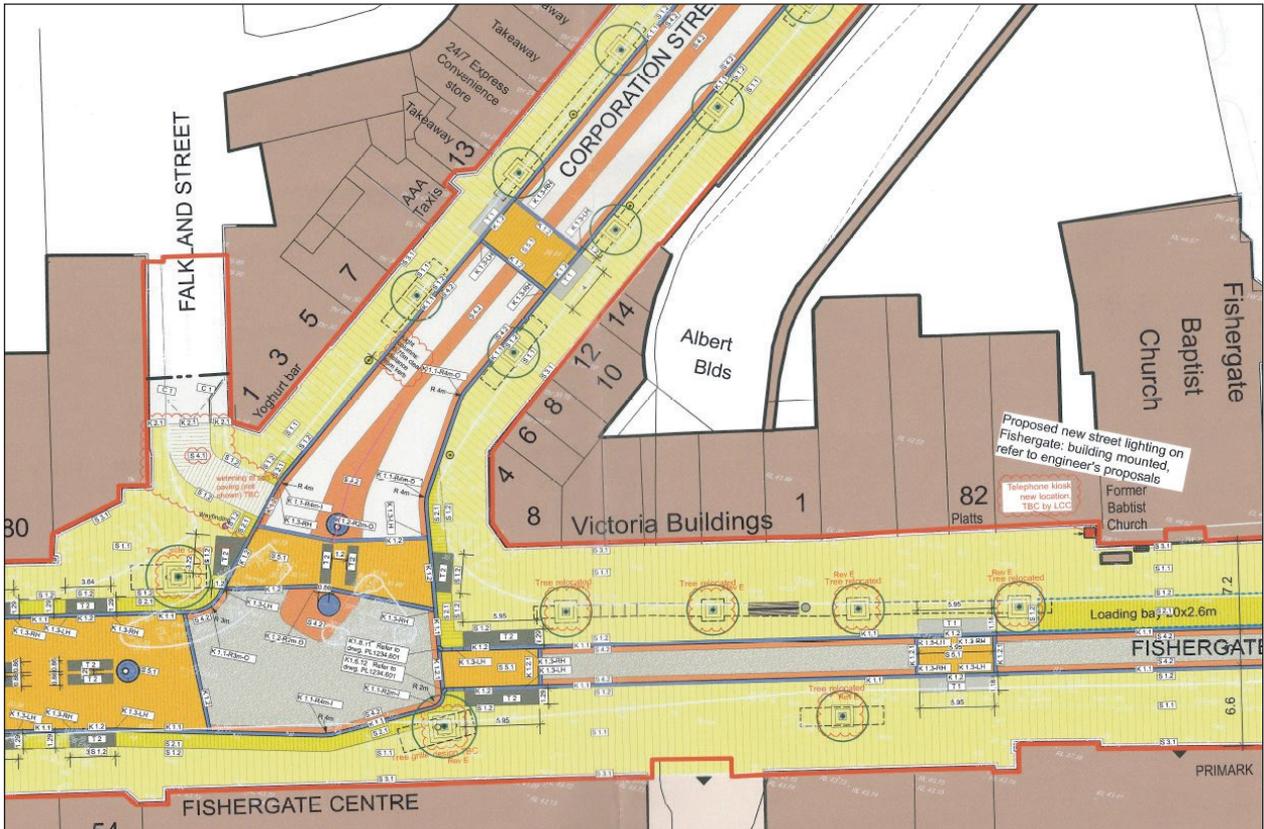


Chapel Street is one of the entry and exit routes for vehicular traffic into the scheme. The large pedestrian flows along Fishergate cross this traffic route. Typically, drivers are courteous upon entry into the scheme (60%) but far less courteous upon exiting (24%)

Kerb Heights

40mm upstand (bullnose) but flush at crossings





Fishergate/Corporation Street Junction (Phase 1) details: Drawing Image provided by Planit IE



3. Evaluation of Performance

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

During the period of February to May 2013, scheme design staff held a number of focussed sessions with equality group representatives to inform and shape the design of the Central Gateway project. The original design concept was changed following requests from the group. The changes include the following:

- Kerb height: increased from 25–30 mm to 40 mm;
- Kerb definition: clear colour contrast requested – black granite kerb introduced;
- Kerb design: kerb edge to be suitable for a cane to detect. Three design solutions presented to group, bullnose option chosen;
- Crossing points: request for crossings to be clearly defined. The depth of tactile paving extended from 800 mm to 1,200 mm at the crossing. Group requested that a zebra crossing be incorporated into the scheme. This request was turned down. Designers considered that this would undermine the principles of the scheme removing any positive guidance to drivers in respect of priority. The scheme was constructed with 9 courtesy crossings to replace 4 signalised crossings;
- Street clutter: request for street furniture to be kept to a minimum and located to reduce obstruction hazards. Response: All existing street furniture removed; in new scheme, all lighting is from buildings, hence avoiding need for lamp columns. Benches, litter bins, cycle stands, and trees are in the same line to provide wide, clear space for pedestrians.

In practice, the greater width of the footways and the alignment of street furniture has made it easier for all user groups including visually impaired people to move along the footways along the length of Fishergate.

The provision of benches at regular intervals has been positively received by users of the street.

Overall, the feedback from visually impaired users to the council's Equality and Cohesion Manager has been mixed and polarised. Some feel content to use the street, find the widened and uncluttered footways a significant improvement, and can negotiate crossing the street via the courtesy crossings, especially with the lower traffic speed and narrower lane widths. Others, however, consider the removal of the traffic signals has created a greater feeling of uncertainty about crossing the road, resulting them not to come to the street on their own. Several suggestions have been made to the Equality and Cohesion



Manager as to how to improve the street design for visually impaired people. These include:

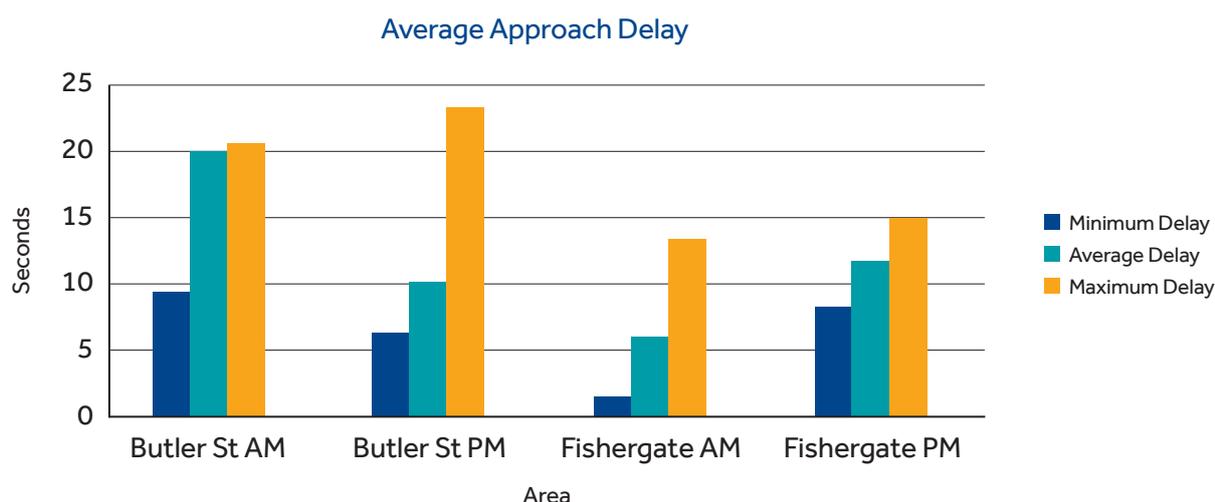
- increasing the kerb height from 40 mm,
- increasing the contrast between the kerb and channel block,
- making courtesy crossings more 'zebralike' and/or providing a couple of formal zebras within the scheme,
- extending the tactile paving to the building line such that the crossing points can be more easily located,
- controlling street clutter and removal of 'A' boards, and
- improving colour contrast on benches and cycle racks.

LCC is seeking to take on board these comments and is continuing to liaise with local equality groups on the design and implementation of further schemes in the city centre.

Ease of Movement – Vehicles

Surveys were undertaken by LCC in January/February 2015 following completion of phase 1. In the busiest hours, 600–650 vehicles per hour travel along Fishergate. At the busiest times, 1,100–1,400 vehicles per hour pass through the Fishergate/Corporation Street/Butler Street junction.

Traffic at these volumes is subject to little delay. Delay surveys were taken by LCC both at the western end of Fishergate and at Butler Street. Typically, traffic is delayed on average less than 10 seconds exiting Fishergate and less than 20 seconds exiting from Butler Street, even in the peak hours. Delays are fewer now than when the traffic signals were in place.



The average traffic speed was surveyed in 2015. In the heart of the scheme along the central section of Fishergate, the average speed was 13 mph with an 85th percentile speed of 18 mph. The average traffic speed at the edge of the scheme at Chapel Street was 20 mph and on Fishergate (west end) 18 mph, with 85th percentile speed of 23 mph and 22/25 mph (westbound/eastbound), respectively.



Speed surveys in October 16 show a slight increase in vehicle speed at Pitt Street (scheme boundary) of approximately 2 mph over the 2015 figures.

The statistics show that vehicles are moving through the scheme with little delay and at low speed along Fishergate. On the periphery of the scheme, some traffic is travelling at more than 20 mph.

The section of the scheme that has generated most comment is the length nearest the rail station around Corporation Street and Butler Street. The carriageway layout here provides no guidance as to vehicle priorities. Some drivers treat the junction as give way to the right. Others consider Fishergate the main road. The right turn restriction from Butler Street is often ignored. From a pedestrian perspective, courtesy levels are lowest in this area.



Butler Street Junction



Fishergate crossing at Corporation Street

There have been congestion problems with the scheme on very busy shopping days pre-Christmas. At these very busy times, the normal give and take of motorists at certain junctions broke down, and some movements became severely disadvantaged. Previously, traffic signals had provided some equity between differing traffic flows. In the 2016 Christmas shopping period, a bus lane (experimental Traffic Regulation Order) operating between 1100 and 1800 on Fishergate was introduced. This resolved the congestion issues with the scheme, but a wider evaluation of its impacts has yet to take place.

Ease of Movement – Pedestrians

Along the length of Fishergate and Church Street, the footways have been widened by approximately 2 m on either side of the street and are now typically 5 m wide. This widening and the removal of guardrail and other street clutter has greatly eased movement along the street. Footfall along Fishergate (survey at Mount Street) is circa 20,000 pedestrians per day (0700–1900, February 2015 count).



Prior to the scheme, signalised crossings along Fishergate were available at Corporation Street, Mount Street, Chapel Street, and Lune Street.

The scheme has removed all the signalised crossings and replaced them with courtesy crossings at approximately 40 m intervals along the length of Church Street and Fishergate.

Pedestrians do not necessarily cross at these courtesy crossings; many simply cross the road along their preferred desire line. Vehicles generally do not cede priority to pedestrians at these crossing points (courtesy rate = % of drivers ceding priority to pedestrians).

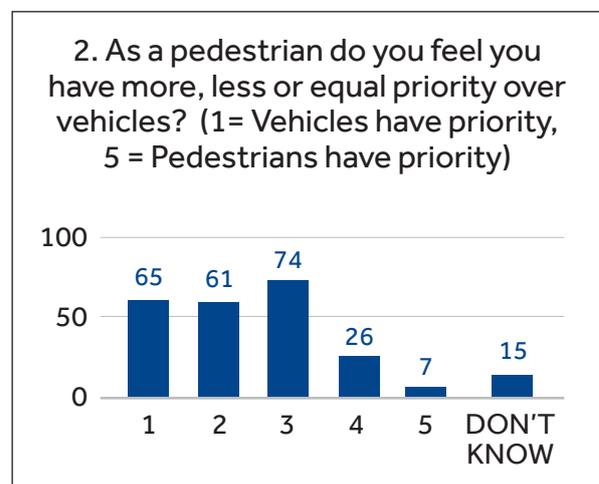
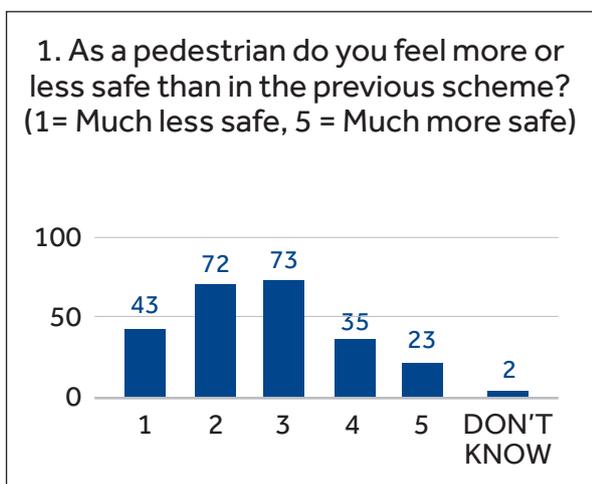


Fishergate Central section

Pedestrians typically wait for gaps in traffic; however, given the scale of traffic flow, there are numerous gaps, and pedestrian delays are typically only a few seconds. Pedestrians are also subject to little delay in crossing the side streets, with surveys showing delays of 10 seconds or less.

Drivers on side roads approaching Fishergate are more courteous to the dominant pedestrian flow along Fishergate itself. At Chapel Street, 61% of drivers entering the scheme from Chapel Street ceded priority to pedestrians, and 24% of drivers exiting the scheme gave way to pedestrians.

The observed low courtesy rate on the crossings across Fishergate was reflected in the on-street interview of users. The majority of pedestrians considered they had less priority than vehicles within Fishergate.





Although overall, users considered the changes made to Fishergate had made it better, 47% of pedestrians felt it was less safe, 29% felt no difference and 24% felt safer.

In summary, it is considered that pedestrian connectivity in Fishergate has improved. However, the loss of formal signalised crossings and the level of courtesy at the crossings are issues for some user groups.

Ease of Movement – Cycling

Little information is available on cycling in Fishergate. Surveys after phase 1 indicate approximately 10 cyclists per hour eastbound (against the one-way traffic system) and a slightly higher number westbound (with traffic), with 10 per hour in the a.m. peak and 20 per hour in the p.m. peak period. Generally, cyclists use the vehicular carriageway when travelling westbound.

Improved Safety and Public Health

Information on reported accidents has been collected from the website crashmap.co.uk. Detailed 'before' scheme accident data has also been provided by LCC.

Less than two years of post-phase 1 scheme accident data is available. No post-phase 2 data is yet available.

In the phase 1 scheme area, there were 13 reported accidents on Fishergate in the 3-year 'before' period, 2011–2013 – 2 serious and 11 slight. Of these, 1 serious and 3 slight involved pedestrians, and 1 serious and 1 slight involved cyclists. In the phase 1 area in the first-year post-opening, there were 4 reported accidents; all 4 were slight. Of these, 3 slight accidents involved pedestrians, and none involved cyclists.

The scheme has not yet been in situ for a sufficiently long period for conclusions to be drawn upon safety impacts. However, LCC's early indications based upon analysis of 21 months of post-scheme accident data is that accident rates may have been halved, with a reduction in those seriously injured and in the number of accidents at junctions.

No information is available on the public health impacts of the scheme.

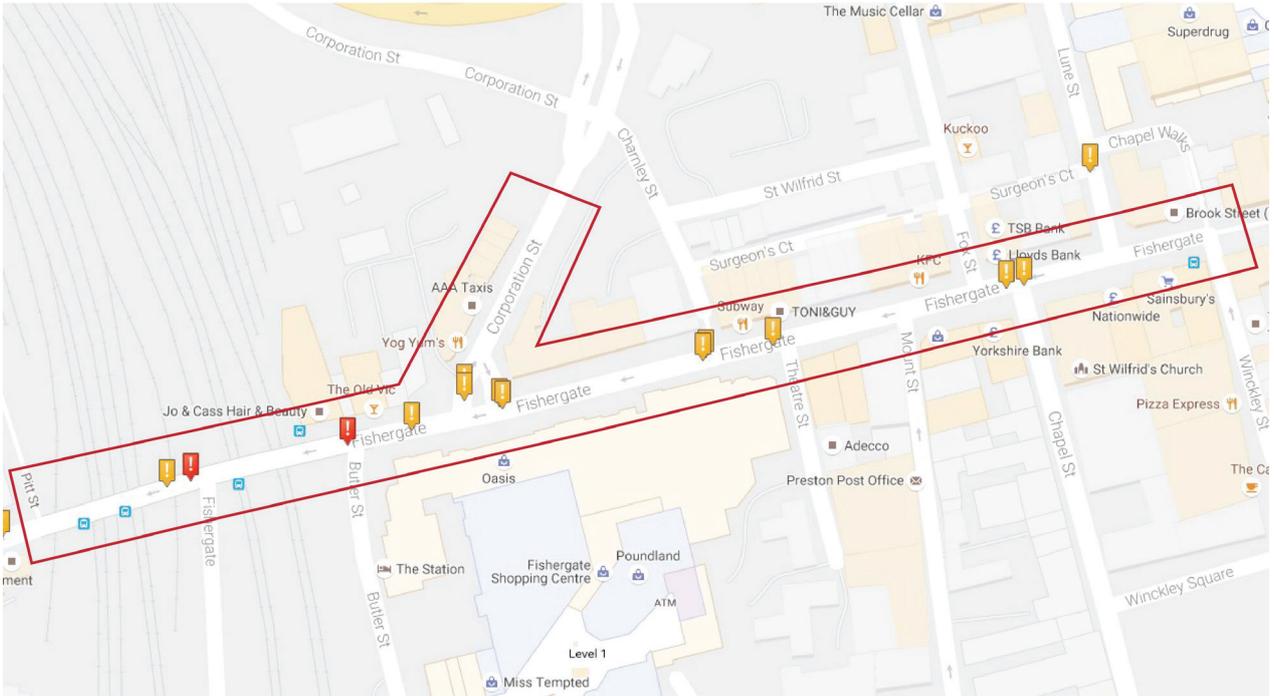
Key for crashmap information:

Incident Severity

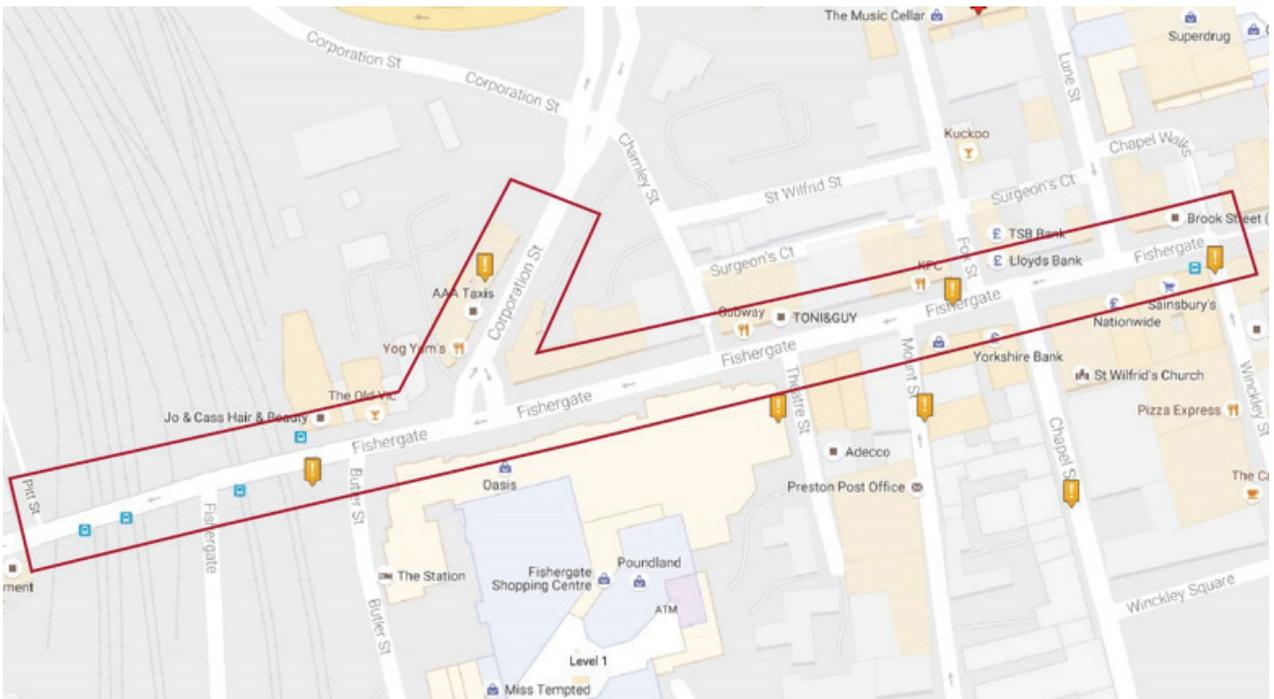


All Casualty Types

Before Construction (2011–2013):



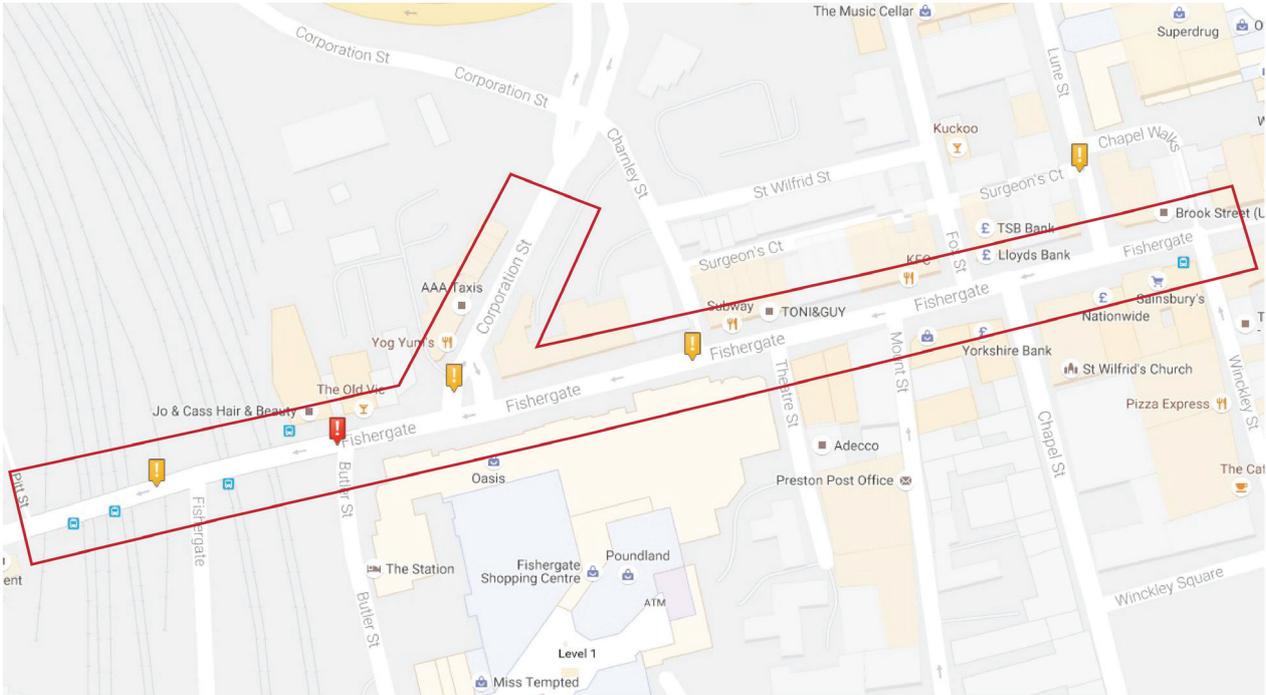
After Completion (2015):



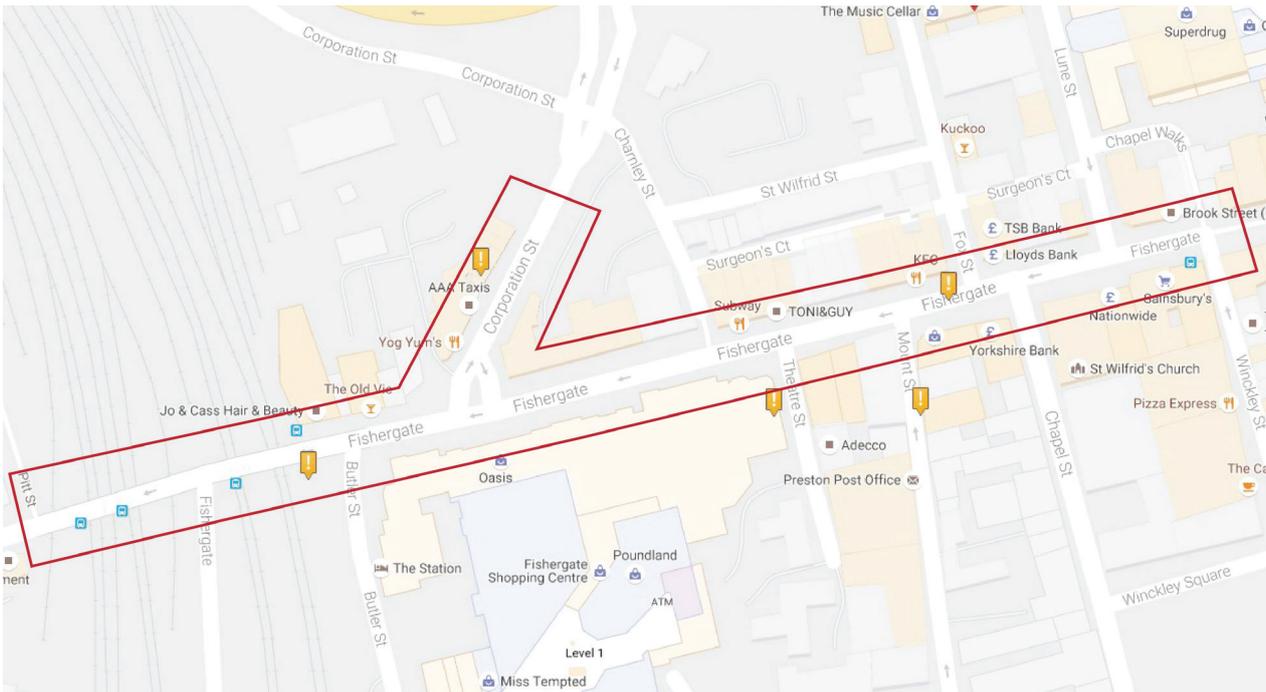


Pedestrian Casualties Only

Before Construction (2011–2013):



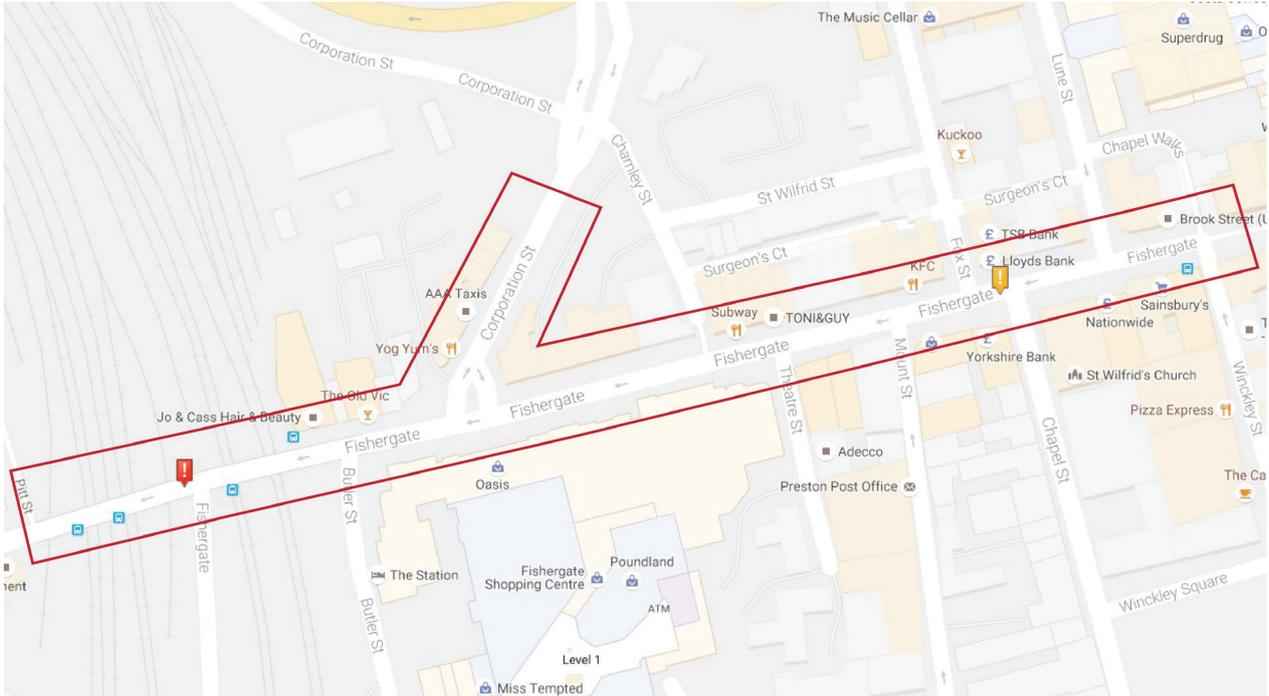
After Completion (2015):



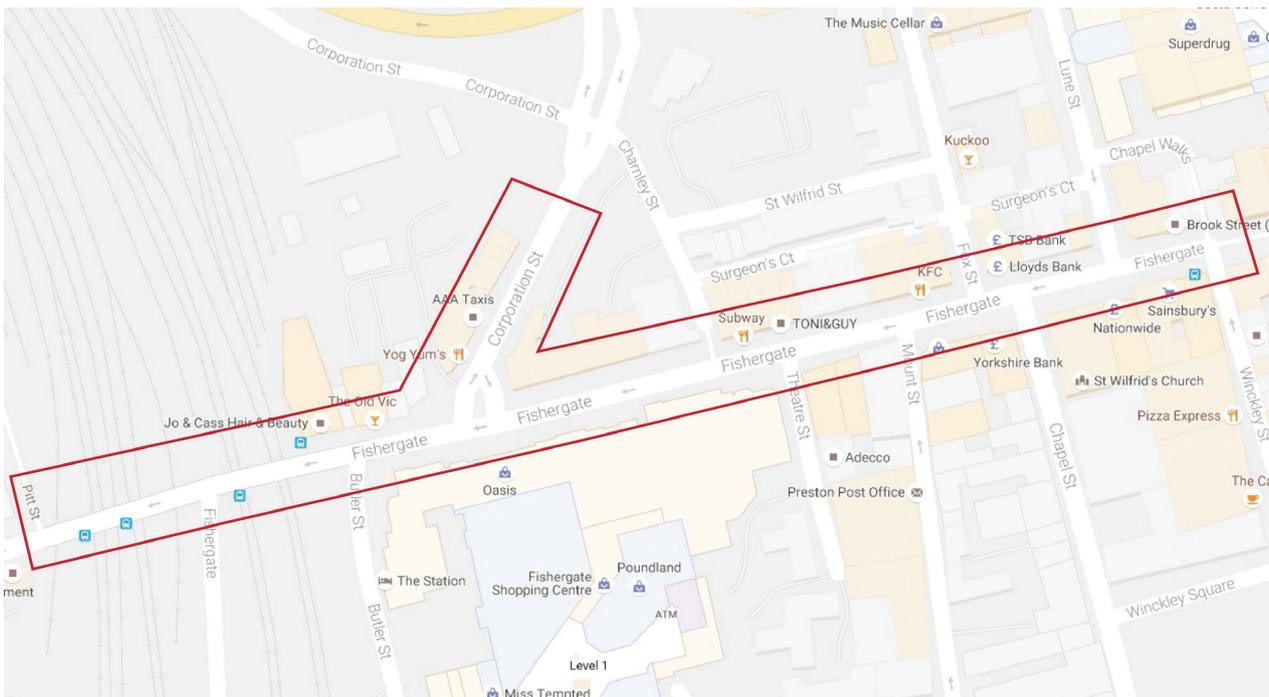


Cyclist Casualties Only

Before Construction (2011–2013):



After Completion (2015):





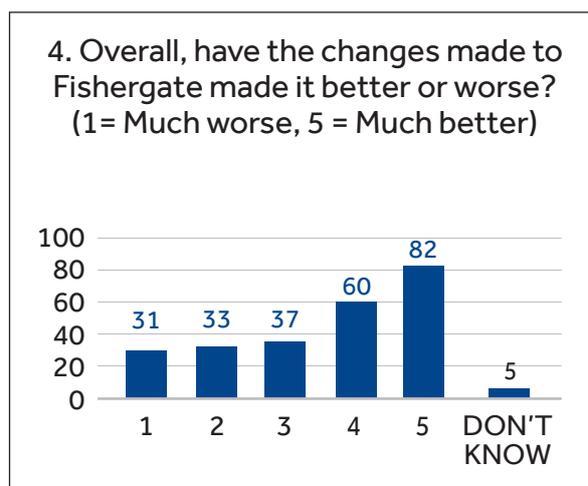
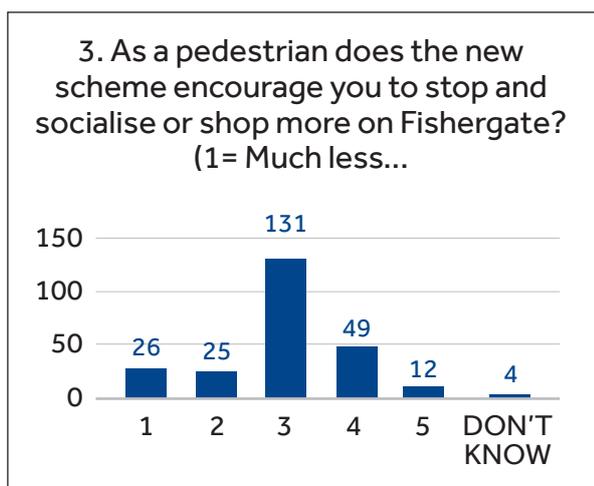
Quality of Place

There have been significant improvements to the attractiveness and quality of the public realm (see before-and-after photos). Clutter in the streets has been significantly reduced with the removal of traffic signals, guard railing, and much signing. Footways are now much wider, typically greater than 5 m compared with 2.5 to 3.0 m before the scheme.

Trees have been planted along the street. Benches have been placed at regular intervals along Fishergate (circa every 40 m).

Materials are of high quality, footways are granite slabs, and kerbs are granite. Lancashire County Council (LCC) has also worked with Virgin Trains and Network Rail to improve the forecourt of the rail station to mirror the quality of the Fishergate Central Gateway scheme.

Soon after the completion of phase 1, LCC conducted an on-street survey with members of the public. There were 248 people who completed the questionnaire, 13 with mobility impairments. Responses to 2 of the 5 questions relate to the quality of place. The results were as follows:



Overall, the public were 'neutral' on whether the scheme would encourage them to stop or socialize more. There 131 who responded 'no difference', with 61 saying it would encourage them more and 51 encourage them less.

However, the public considered that overall, the scheme had made Fishergate better. There were 142 who responded that it was better compared with 64 who thought it was worse. In summary, it is considered the quality of the place has been greatly improved by the implementation of the scheme.

Economic/Regeneration Benefits

Little information is yet available on the economic/regeneration benefits. It is understood that vacancy rates along the street have reduced from 18% before the scheme to 8% after. Retailers have also informally reported an increase in trade immediately following completion of phase 1.



4. Conclusions

A summary of the impacts for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

+ve	-ve
-----	-----

The limited feedback on the success or otherwise of the scheme for people with mobility impairments is mixed. Wheelchair users and those with prams and buggies can move through the area with much greater ease. The impact of the scheme on visually impaired people is mixed and polarised. Certain visually impaired users are content to negotiate the street, find the widened footways and lower vehicle speed help movement, and can cross at the courtesy crossings. Others, however, consider the crossings do not provide them with sufficient certainty and are not willing to use the street on their own.

Ease of Movement

+ve

Pedestrian connectivity has been greatly improved but without detriment to vehicle delay or to cyclists. The number of crossing points has greatly increased, and the pedestrian wait time at each has reduced. Vehicle delays are small, and vehicle speed through the heart of the scheme is circa 15 mph. Formal, signalised crossings have been removed at four locations, generating some concern.

Improved Safety and Health

Insufficient information

This scheme has not been in place for a sufficiently long period for any conclusions to be drawn.

Quality of Place

+ve

A more attractive environment has been created. The scheme has created areas for activities, such as dining, sitting, and talking in the street. Footways have increased in scale and carriageway space reduced.

Economic/Regeneration Impact

Insufficient information

Little information is yet available. What is available suggests that the scheme is having a positive impact.



Case Study 9: Hamilton Road, Felixstowe, Suffolk

Informal Streets, Link and Junction

1. Introduction

Hamilton Road runs through the centre of Felixstowe, connecting the rail station to the north with the seafront to the south. The two sections of Hamilton Road which were transformed in 2010 (shown in red in the diagram below) run from Cobbold Road to Wolsey Gardens. The focus of the transformation, and therefore this case study, is the northern section from Cobbold Road to Orwell Road.



Scheme location in England



Scheme location in Felixstowe

Before the construction of the scheme in 2010, the quality of the pedestrian environment along the road was poor and there was little sense of place. The footways were relatively narrow; there were few trees, no planting and no areas of public space. The road was dominated by parking, which minimised opportunities to cross safely, and the street had poor connectivity to the seafront.



To inform the development of designs to improve the street, Suffolk County Council gained inspiration from precedents of contemporary schemes, which included New Road in Brighton, Lund in Sweden, Lyngby in Denmark and Allerød in Denmark.

In addition, study visits were undertaken to observe Pedestrian-Prioritised/Informal Streets in Ashford, Norwich and Brighton. The scheme had a wide representation on its project board, and as such, any identified issues were discussed early on.

A key feature of the new scheme is the removal of kerbs to provide a level surface, which has been created with block paving in three shades of grey.

The street has remained one-way for vehicles and has been designated a Restricted Parking Zone, where parking of vehicles is prohibited at all times, and loading and disabled parking is permitted in a small number of bays, which are denoted using dark grey blocks.

Several planting and seating areas can be found along the street, and courtesy crossings have been provided at either end of the scheme, which are marked by using two tones of grey stone.

This scheme was designed and constructed in-house and won the CIHT Street Award in 2011. The Council reported that the project was completed on time and within budget.



Hamilton Road: view north towards the Cobbold Road junction at top of photo



Example of scheme precedent used in the design – Lund, Sweden

Aims

- To improve pedestrian safety
- To provide a link between the town and the seafront
- To improve the quality of the public realm for residents, businesses and visitors
- To attract investments into the town



Images Before





Images After





2. Technical Data

Dates	Construction began in February 2010 and was completed by December 2010
Cost	Approximately £800k Funding was provided by the Haven Gateway Growth Point Fund
Traffic Volumes	Approximately 200 vehicles pass through the scheme during the busiest hours
Traffic Speed	The average speed along Hamilton Road is 14 mph
Pedestrian Volumes	There is an hourly footfall of over 700 pedestrians
Pedestrian Volumes	Increased number of crossing since opening in 2011 as a result of significant ongoing development within Gloucester Quays
Pedestrian Crossing Movements	There were over 300 pedestrian crossing movements recorded per hour with a courtesy rate at the junction of Hamilton Road and Cobbold Road of 88%
Road Safety	There has been a decrease in collisions along Hamilton Road (link) but an increase in collisions at the junction with Cobbold Road



3. Evaluation of Performance

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

In addition to a public exhibition, presentations and seminars, the consultation process included engaging with certain disability groups. As shown in the photos below, trials of tactile paving materials were undertaken and site visits were arranged with groups which included mobility-impaired people.

The 220-m-long level surface section of Hamilton Road has a tactile paving guide path along each side of the road to aid visually impaired people in navigating the street. However, it was evident that in places, the guide path is covered by A-boards. Granite was used for the guide path as it gives a more pronounced profile that will wear better than alternative materials that are available.



The courtesy crossings at the junction of Hamilton Road and Cobbold Road have a high observed courtesy rate of 88% and therefore appear to be working well overall. There is no information on the crossing behaviour at the other crossings or how well the courtesy crossings work for particular vulnerable road users.

Some minor alterations could be made at the junctions to benefit vulnerable users. These include tying the end of the guide paths into tactile paving at the crossings and increasing the height of the kerbs around the junctions; they are currently 30 mm, which may be difficult to detect and presents a trip hazard. Also, the tactile paving does not cover the full width of the crossings because they lie partly alongside the junction bell mouth; therefore, full-width tactiles would require a large area of tactile paving.

There is currently a lack of information on the presence of mobility- and visually impaired people in Hamilton Road before and after the scheme was constructed.

Ease of Movement: Vehicle Movement

In terms of vehicle movement, the functionality of Hamilton Road has not changed since the scheme was introduced. It is still one-way, with priority junctions at either end. However, the design creates a chicane effect, which helps to control traffic speed.



Before 2010, there was minimal delay to traffic, as the only crossing facilities on the link section were two build-outs, alongside which were raised areas of carriageway. There would have been minor delays because of other vehicles manoeuvring into parking bays.

With the new scheme, the informal crossing arrangement and removal of parking means that the delays to traffic are not likely to have increased.

At the Orwell Road junction, vehicles exiting Hamilton Road (the northern arm) previously had to give way. With the new layout (shown below), there are no give-way markings at the junction and courtesy crossings are located on three arms (not on Hamilton Road's northern arm). Therefore, the delay to vehicles exiting Hamilton Road is likely to have reduced. There is no information on the courtesy rate of the crossings at this junction. However, if similarly high to the crossings on Cobbold Road (described below), then because of the increased number of crossing points, the delays to traffic on the other arms may have increased.

Ease of Movement: Pedestrian Movement

This area is heavily used by pedestrians with a flow of approximately 700 pedestrians per hour and about 300 crossing movements per hour. Since the scheme opened, it has been reported that pedestrians feel comfortable using the full width of the street and that they can cross with ease. Given the relatively low volume of vehicles and low traffic speed, pedestrians can generally cross the road within the general flow of vehicles; therefore, there were few instances where either motor vehicles or pedestrians need to stop to let the other pass.

On the northern section of the scheme, courtesy crossings are provided on three of the four arms at each end of Hamilton Road. It was felt a courtesy crossing on Hamilton Road itself (the fourth arm) was not necessary given that pedestrians can cross freely within this section. Previously, both junctions had a zebra crossing on one arm. The courtesy crossings are formed by two tones of grey stone material.

The crossings at the junction of Hamilton Road and Cobbold Road have a high observed courtesy rate of 88%.



Ease of Movement: Cycle Movement

The street was not heavily used by cyclists before the scheme was implemented, with a maximum of 10 cyclists per hour. There is no post-scheme survey data on cycle movement, but it is felt that the demand is unlikely to have changed significantly. Given the low volume and speed of motorised vehicles, cyclists should feel relatively comfortable using the same implied running surface as vehicles.



Whilst pedestrians now have freedom to cross wherever they want on the link section of Hamilton Road, as the surfacing and placement of street furniture denotes the transition between pedestrian-only and vehicle-movement areas, the likelihood of conflict between pedestrian and cyclists is minimal. The openness of the space through the removal of parking has improved visibility between motor vehicles/cyclists and pedestrians, and this also reduces the potential for conflict.

Improved Safety and Public Health

From a seven-day monitoring period carried out by Suffolk County Council, the average speed of vehicles along the street was recorded as 14.2 mph and the 85 percentile speed was 18.6 mph. Given that the speed limit along Hamilton Road is still 30 mph, it is likely that the overall change in character of the street and/or the physical design features (e.g., chicane effect and narrowed vehicle running path) have contributed to the low vehicle speed.

For comparison, the mean and 85th percentile speed in the adjacent roads (albeit as recorded in 2009) range from between 19–24 mph and 24–29mph respectively.

There were initial concerns that after the scheme was introduced that traffic may disperse to these adjacent roads. Minor improvements were made to adjacent roads to deal with additional traffic. However, these concerns were unfounded as the impact on the roads is negligible.

Collision data for the five years before and after the scheme was built are presented below. The information is from crashmap.co.uk and focuses on the northern section of the scheme with a close-up view of the Cobbold Road junction. For the 5 years before construction of the scheme, there were 8 casualties across 7 collisions along Hamilton Road: 2 serious and 6 slight with 7 involving pedestrians and 3 involving older people. In the five years after the completion of the scheme, there were 10 casualties across 8 collisions: 2 serious and 8 slight with 6 involving pedestrians, 7 involving elderly people and 1 involving a child.

The maps below indicate that there has been a reduction in collisions along the length of the road but an increase at the junction with Cobbold Road. This information shows that there has also been an increase in the number of collisions involving pedestrian casualties.

The collisions have remained relatively high at the junction of Hamilton Road and Cobbold Road. However, from analysis of the individual detailed collision reports, many of these incidents appear to be the result of poor driving technique, such as pushing the wrong pedal and failing to spot a pedestrian when reversing.



Key for crashmap information:

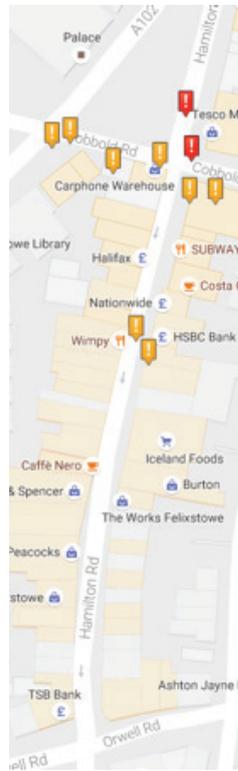
Incident Severity



All Casualty Types:

Before construction (2005–2009)

After completion (2011–2015)





Key for crashmap information:

Incident Severity

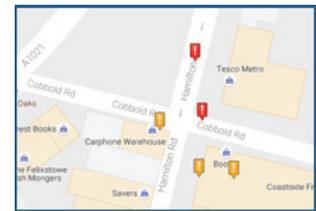
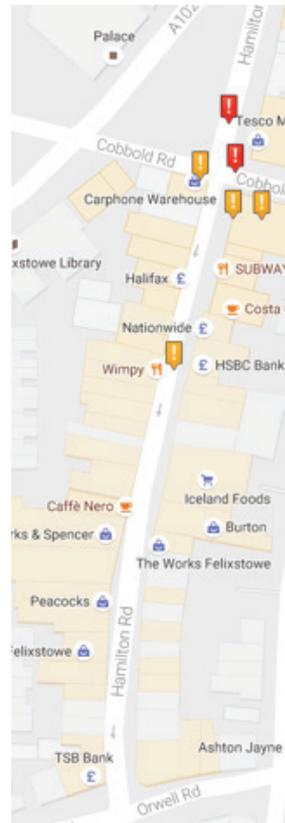
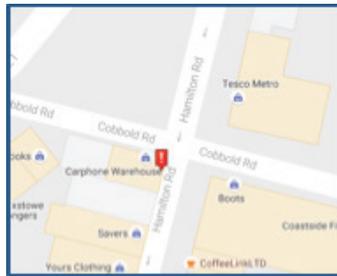


Slight Serious Fatal

Pedestrian Casualties:

Before construction (2005–2009)

After completion (2011–2015)





Quality of Place

The Hamilton Road scheme is 320 m long and is formed in two sections: the 220-m-long high street between Cobbold Road and Orwell Road and the remaining 100 m southern section between Orwell Road and Wolsey Gardens.

The northern section has been comprehensively transformed along the length of the street; whereas in the southern section, the changes have largely been limited to raised tables with courtesy crossings and footway resurfacing.

Whilst not part of the Hamilton Road scheme, a third section on Bent Hill leads south from the Wolsey Gardens junction to connect with the seafront.

The northern section of the street comprises a level surface with Charcon synthetic block paving in three shades of grey. A synthetic material was used because it is cost saving compared with natural stone. The designers intentionally used more contrasting coloured blocks as they knew they would darken, so now, there is a more subtle differentiation than there was when the scheme was built. The paving contains a series of parallel bands of darker grey blocks which extend out from the buildings on either side of the road. The bands vary in length and stop short to denote the running path of vehicles.

The blocks were laid on top of the existing surfacing to provide significant cost saving.

A tactile guide path runs along the length of the road on both sides and generally follows the alignment of the old kerbline. There is a slot drain next to the tactile paving which connects into the existing drainage system.

Areas of loading/disabled parking, planters and seating create a chicane for vehicles, which breaks up the linearity of the street and provides side friction, which helps to attenuate the speed of vehicles.



Parallel band of blocks denoting running path of vehicles. Tactile guide path shown to right of photo

There are five areas of seating, all of which have different layout configurations. These areas are really well used. Through a lease agreement with the Council, two coffee shops have introduced tables and chairs on the street outside their shops for use by their customers.

Street clutter has been minimised by removing the majority of street signs and bollards. Additional street furniture has been introduced in the form of seating, planters and cycle stands. The use of sign poles is avoided through placing parking restriction sign plates on planters.



Advanced signing was included at a later date to warn drivers that they are entering a shared-space area.

The scheme includes a canopy at the Triangle, which is the northernmost point of the Hamilton Road scheme. This is the centrepiece for what constitutes a new town square.

Economic Benefits

There are a range of retail and office spaces on Hamilton Road, and there has been increased interest from larger businesses in investing in Felixstowe since 2011. As a response to this, ten new high-quality business units were built on Hamilton Road. There has been a growth in restaurants, including high street chains, such as Prezzo's, which now occupies a building on Hamilton Road.



Planter with waiting & loading signage

Following the introduction of the scheme, some Edwardian shop premises and a hotel have been refurbished and are now fully operational again.

Since 2012, Felixstowe has had an events coordinator who takes charge of all major events in the town. The canopy at the Triangle is a popular location for such public events. This creates interest in the wider area and attracts people from outside the town.

One of the most significant changes from the scheme is the reduction in on-street parking along Hamilton Road. There is no information whether this has affected business. However, drivers can park for free for up to 1 hour during the daytime on adjacent streets, and there is a large pay-and-display car park at the top of Hamilton Road. There is no information on capacity and occupancy of these parking facilities.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Insufficient information

The development of the scheme was inclusive and well considered, with trials of tactile paving and site visits with mobility impaired groups. However, there is a lack of information on how the implementation of this scheme has affected vulnerable road users, including visually impaired people.

From observations, there appear to be some relatively minor issues with the design detailing at junctions, relating to the guide path and kerb heights, which may make this part of the street more difficult for visually impaired people to negotiate. There were some A-boards placed on the guide paths, which may also hinder navigation by visually impaired people.

The use of a level surface and removal of parking will have helped improve access by mobility-impaired people.

Ease of Movement

+ve

There has been a significant improvement in the quality of the pedestrian environment, both in terms of facilitating movement along the street, as well as giving pedestrians freedom to cross wherever they want in relative safety. Courtesy crossings are provided at junctions, and surveys undertaken for some crossings show that there is a high observed courtesy rate of 88%.

It has been reported that pedestrians feel comfortable using the full width of the street, and given the relatively low volume of vehicles and low traffic speed, pedestrians can generally cross the road within the general flow of vehicles, rather than having to wait to cross. Areas of loading/disabled parking, planters and seating create a chicane for vehicles, which breaks up the linearity of the street and provides side friction, which helps to attenuate the speed of vehicles.

With improvements also made to Bent Hill, there is now a continuous high-quality legible route from the heart of the town centre to the seafront.

Improved Safety and Public Health

Neutral

Whilst there has been an overall decrease in the number of collisions along Hamilton Road, there has been an increase in collisions that occur at the junction with Cobbold Road, although many of these are reported to be from driver error, which may not be directly linked to the design itself.



Quality of Place

+ve

The scheme has provided considerable enhancements to the public realm and has significantly enhanced the sense of place. The success of the design approach taken may be, in part, because of the research that was undertaken into design precedents for successful contemporary schemes in several European cities as well as those in the UK. Street clutter has been minimised by removing the majority of street signs and bollards, and useful street furniture has been introduced in the form of seating, planters and cycle stands. The continuous and consistent treatment along the street has given this location a new sense of identity as a shopping centre, a high-quality link to the seafront, and as such, the street is now a destination in its own right.

Economic Benefits

+ve

It appears that the scheme has had a positive impact on businesses, with new businesses opening, including chain stores. There has also been new retail investment interest from larger businesses, which may have a significant influence on the local economy. There is no information on whether there has been an impact on trade from the removal of parking, but the availability of parking facilities on adjacent streets will have mitigated any potential adverse impacts.



Case Study 10: Walworth Road, London Borough of Southwark

Enhanced Street, Link and Junction

1. Introduction

Walworth Road runs from Camberwell to Elephant and Castle in the London Borough of Southwark. The streetscape improvement scheme extends from the junctions with Amelia Street to Arnside Street, over a distance of approximately 750 m. This area is a busy retail and commercial centre with some residential uses above the shops.

Before the implementation of the scheme in 2007, there were narrow footways on both sides and a four-lane carriageway, one all-purpose vehicle lane, and one bus lane in each direction. Traffic-signal-controlled junctions and crossings were provided at regular intervals.

The scheme, which formed one of the Department for Transport's Mixed Priority Route Demonstration Projects, concentrated largely on improving the pedestrian experience as well as the overall quality of the place. This required significant alterations to the layout and design of the street.

The carriageway was narrowed and reduced to two all-purpose lanes through the removal of the bus lanes, and a 20 mph limit was established.

Bus gates were included at the entrances to the scheme to reduce travel time for buses on the approaches and to compensate for the removal of the bus lanes.

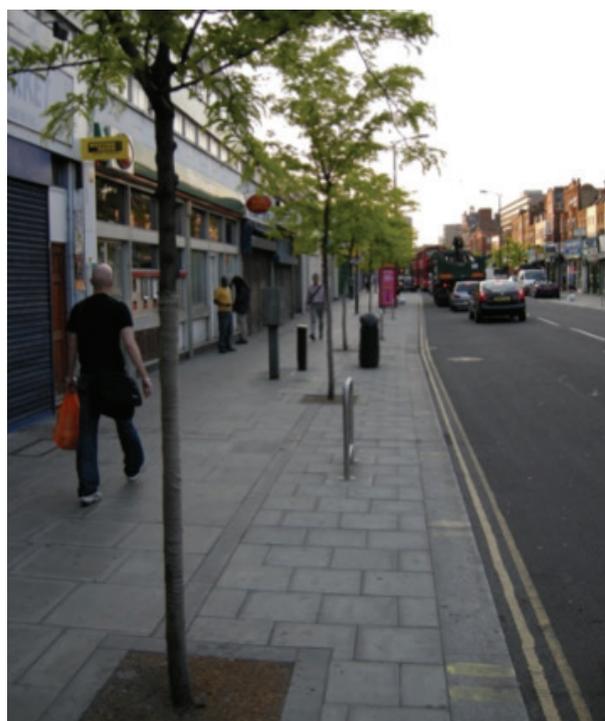


Figure 1: Walworth Road; wide footways provide more space for pedestrians.



Traffic signal control was retained at two staggered junctions, with additional signal crossings being installed at the junction with East Street. Two stand-alone signalised crossings were also provided, together with informal crossing opportunities at a flush median strip.

The footways were widened, and the extensive guardrail separating pedestrians from the carriageway, as well as unnecessary street clutter, was removed. Footway-level crossovers were provided at the numerous side roads, including at the traffic signal junctions.

There was previously a lack of parking for service deliveries, which resulted in illegal parking and congestion. The guardrail also posed a major problem for servicing premises from the front. Loading areas at footway level were provided to enable this to happen without disrupting the flow of traffic. When the loading areas are unoccupied, they can be used by pedestrians. Some concerns have been expressed about this detail by groups representing visually impaired people.

Along some sections of the scheme, flush/low-height kerbs have been used, including at a raised traffic signal junction, to make it easier for people to cross the carriageway. Corduroy warning paving has been used to enable visually impaired people to detect the edge of the carriageway. This has caused some problems with surface water drainage.

Aims

- **To improve conditions for pedestrians**
- **To reduce accidents and make Walworth Road a safer place, including at night**
- **To improve the public realm and create a more attractive environment**
- **To promote Walworth Road as a commercially active town centre**
- **To not adversely impact on bus journey times**



Images Before





Images After





2. Technical Data

Dates	This scheme was constructed in 2007
Cost	£4m
Traffic Volumes	Approximately 20,000 vehicles pass through the scheme per day. This number includes up to 180 buses using the scheme per hour with 10 different bus routes
Traffic Speed	20 mph speed limit. Average journey speed (including junction delay) between 8 and 11 mph, generally unchanged by the scheme
Pedestrian Volumes	Average footfall per hour, both sides 10:00–17:00 (2015) 790 Tuesday 910 Saturday
Pedestrian Volumes	Increased number of crossing since opening in 2011 as a result of significant ongoing development within Gloucester Quays
Pedestrian Crossing Movements	Not available
Road Safety	21% reduction in the number of recorded accidents per annum



3. Evaluations

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

Data in the 2012 monitoring report shows that there has been a substantial increase in the number of vulnerable road users using Walworth Road since the completion of the shared-space scheme.

The survey identifies five types of vulnerable road users: accompanied children, unaccompanied children, older people, pram users and mobility-impaired people. An increase was observed in all five of these categories; the smallest increase (36%) was seen in accompanied children, and the largest (174%) was seen in mobility-impaired people. No data on the use of the street by visually impaired people is available, however.

Based on the above information, it is concluded that the scheme has had a positive effect on inclusivity for most relevant protected groups, but it is not possible to objectively assess the impact on visually impaired people.

Ease of Movement

Walworth Road is a busy street with high pedestrian and vehicle flows; 20,000 vehicles per day were recorded as passing through the scheme prior to its construction, including 180 buses per hour across 10 different bus routes. This is also a critical route for ambulances.

Monitoring carried out by LB Southwark in 2015 shows that 30% of people use public transport (bus/train/tube) to travel to Walworth Road, a further 26% walked, 12% cycled and 31% came by car. There are thus high levels of sustainable transport use.

A scheme-monitoring report prepared by Project Centre in 2012 reported that there had been substantial reductions in overall traffic levels following the scheme:

	Northbound traffic			Southbound traffic		
	Before (2004)	After (2008)	Diff	Before (2004)	After (2008)	Diff
0700-0900	1612	884	-45%	638	666	+4%
1200-1400	851	485	-43%	641	429	-33%
1600-1900	1223	912	-25%	1271	857	-33%



This may be caused by drivers choosing to avoid what appears to be a narrower and slightly slower route and also by the increase in the use of sustainable modes.

The 2015 surveys found there is an average hourly footfall of 850 people on Walworth Road (790 Tuesday, 910 Saturday), placing the street around midway in the ranking of high streets in the borough.

The 2012 report found that the number of pedestrians had increased in the peak hours following implementation of the scheme, but there had been a decrease on Saturday. This survey may have been affected by weather, however.

The widened footways have resulted in a significant reduction in the density of pedestrians using the footways. It is now much easier to cross both the main and side roads because of the removal of guardrails and the additional crossing facilities. The scheme is therefore positive in terms of pedestrian ease of movement.

Regarding cycling, advanced stop lines were provided at the major junctions. While these are not now regarded as best quality cycling infrastructure, they did provide a worthwhile improvement over the existing situation.

Cyclists now share the lane with all motor vehicles rather than using the bus lanes, but the 20 mph limit has gone some way to reducing the subjective view on safety of this measure.

Project Centre in 2012 reported that cycle flows rose substantially following implementation of the scheme – 123% northbound and 71% southbound during weekdays. The number of cyclists using the footway decreased by 33%. Additional cycle parking stands were provided throughout the scheme.

Overall, it is considered that the scheme has been slightly positive for cycling.

The 2012 report found that bus patronage had significantly increased along Walworth Road – in some cases, by up to 100% per bus.

Based on the pre-and post-scheme surveys reported by Project Centre in 2012, there was little change in average vehicle journey times through this scheme. In most instances, there has been a slight increase. The survey results are summarised in the table below; journey times are given in seconds.

	Average Vehicle Journey Time (s)			
	Southbound		Northbound	
	Before	After	Before	After
Weekday AM peak	154	173	192	200
Weekday PM peak	165	172	146	150
Weekend	187	212	219	184



In terms of ease of movement by private vehicles, the scheme is considered to be slightly negative.

Overall, however, the scheme is regarded as having a positive effect on ease of movement, particularly with regard to pedestrians.

Improved Safety and Public Health

Since the implementation of the scheme and the introduction of a 20 mph speed limit, the average traffic speed has been consistent and markedly below the enforced limit. From the monitoring carried out by Project Centre, a reduction in vehicle speed can be seen, as summarised in the table below:

	Average Vehicle Speed (mph)			
	Southbound		Northbound	
	Before	After	Before	After
Weekday AM peak	17	15	13	12
Weekday PM peak	15	14	18	17
Weekend	14	12	12	14

The 2012 Project Centre report assesses collision data for the periods 2002 to 2006 (pre-scheme) and 2008 to 2011 (post-scheme).

Overall, the number of accidents per year decreased from 39 pre-scheme to 31 post-scheme, a 21% reduction. This is broadly in line with the trend prior to 2006, however.

Overall, the percentage of accidents involving pedestrians has remained relatively constant at around 25% to 35% per year, other than 2010, which saw a spike to 48%. The proportion of accidents involving cyclists has increased in absolute terms from around six to nine per year (50%) but must be judged against a rise in cycling numbers of over 130%.

No data is available on air quality or noise levels, but the reduction in motor vehicle flow would be expected to lead to some improvement.

The increased use of sustainable modes of travel would be expected to have resulted in some public health benefits.

Overall, the scheme is considered to have had a positive impact on safety and public health.



Quality of Place

This scheme focused strongly on improving the experience of pedestrians and making the place more enjoyable to spend time in.

Asphalt and high-quality paving were used for the carriageways and footways respectively, with granite used at kerbs, loading bays and crossing points. Some of the original modular blocks have been replaced because of cracking from the weight of heavier vehicles.

The footways were widened significantly, providing an additional 1,025 m² space for pedestrians and increasing pedestrian capacity by some 18.5%.

Informal crossing points of side roads were provided as granite-surfaced tables, which contrasted with the surface of the carriageway, encouraging drivers to slow down. Signalised crossings and a flush central reservation along a wider section of the scheme allow for pedestrian crossing movements at regular intervals along the street.

The bus stops were grouped in the centre of the shopping area, and 100 mm kerbs have been included at this part of the scheme, making it easier for passengers to enter and exit buses as well as indicating to pedestrians that this is not an appropriate place to cross. Wider footways and waiting area were provided around the bus stops, which has led to less footway congestion.

Improvements were made to street furniture, including 10 new benches, 42 new cycle stands and 72 new trees. These also act as barriers to service vehicles that attempt to park in non-designated loading areas.

The lighting columns have two luminaires: one higher illuminating the carriageway and one lower illuminating the footway.

Street clutter was significantly reduced with the removal of approximately 600 unnecessary signs and poles as well as 425 m of guardrail and 42 bollards.

LB Southwark carried out a survey of 42 users of Walworth Road in 2015. The survey showed that 31% of participants intended to spend 1–2 hours on Walworth Road, and 40% of all people surveyed had the main intended purpose of shopping, with a further 30% intending to meet friends, eat and/or drink. It can be seen that Walworth Road has high levels of place activity.



Figure 2: Improved street lighting at Walworth Road



In summary, the scheme has resulted in a substantial improvement in the quality of place along Walworth Road.

Economic/Regeneration Impact

Of the standard 26 different retail categories, 19 are present on Walworth Road, giving it a retail diversity index of 0.73, according to LB Southwark's surveys of 2015.

Higher diversity generally corresponds with higher footfall and hence greater trade for businesses. From this survey, over 80% of participants identified shopping as either their primary or secondary purpose for being in Walworth Road. Over half of all survey participants expected to spend £30 or more that day. The survey results indicate that Walworth Road is considered more as a shopping destination than a route to pass through.

Unfortunately, no information is available from before the scheme was constructed. Based on other similar public-realm enhancement schemes, it is anticipated that the project would have had a positive impact, but we are unable to provide any conclusive evidence in this report.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

+ve	Insufficient information
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The data available shows that there has been a substantial increase in the number of vulnerable road users. The smallest increase was seen in accompanied children and the largest (174%) in the number of mobility-impaired people. No data on the use of the street by visually impaired people is available, however.

Ease of Movement

+ve

There is now much more space available for pedestrians, and crossing movements have been facilitated through signalised crossings, raised tables at side roads and a flush median strip. Pedestrian, cycle and bus passenger numbers have all increased while private vehicle flows have decreased. Overall, travel times for motor traffic are slightly longer than before, however.

Improved Safety and Public Health

+ve

The total number of recorded accidents has fallen, and the proportion involving pedestrian casualties has remained relatively constant. While the proportion of cycle casualties has increased, this is against a very large increase in cycling flows. Traffic speed is low and was reduced by the scheme. It is expected that there will have been environmental and health benefits because of a modal split away from private car use towards sustainable modes.

Quality of Place

+ve

The scheme has achieved a substantial improvement in quality of place. Extensive lengths of guardrail and street clutter have been removed, and the footways have been paved in high-quality materials. Lighting has been improved, and a large number of trees have been planted. Some of the original paving stones in the carriageway have had to be replaced, however. There is evidence of significant levels of place activity.

Economic/Regeneration Impact

Insufficient information

Walworth Road supports a wide variety of businesses, and footfall levels are high. Unfortunately, no data is available from before the scheme was implemented, and so economic/regeneration impact cannot be assessed objectively.



Case Study 11: Shenley Road, Borehamwood, Hertfordshire

Enhanced Street, Link and Junction

1. Introduction

This is the oldest scheme considered within this review. The Borehamwood scheme demonstrates that shared space-type techniques are not new, as the scheme has now been in operation for over two decades. It features as a case study in the Devon County Council Traffic Calming Guidelines (1991) and TRL's 'A Review of Simplified Streetscape Schemes' (PPR292) of 2006.

Shenley Road is a busy local shopping street in Hertfordshire which also forms a connection between the A1 and A41/M1 corridors. It carries a mixture of local and strategic traffic as well as being an important local hub.

Prior to the scheme being built in 1989 (initially as an experiment), illegal parking was considerable, which created difficulties for pedestrians and reduced road capacity. Traffic speed was considered excessive, leading to road safety, air quality and noise problems. The scheme addressed these issues, as well as reducing congestion by maintaining a regular but slower flow of traffic.

The scheme extends over some 800 m. A central median was introduced, narrowing the carriageway to 3.6 m minimum (in each direction), providing a refuge for pedestrians to cross and eliminating illegal parking. A total of 12 raised flat-top speed tables were created at regular intervals along the length of the street, which operate as courtesy crossings. Traffic signals were replaced by mini-roundabouts at two principal junctions to enable a smoother flow of traffic.

Public consultation took place through leaflets and an exhibition; 'Sharing Our Environment' became the slogan for the project. During the six-month experimental period, pedestrian movement, parking and servicing were studied, and street interviews were carried out to gain the public's opinion. These found that pedestrians could move more freely and with greater confidence because of the more even and slower traffic flows. Because of its success, the scheme was retained and extended.



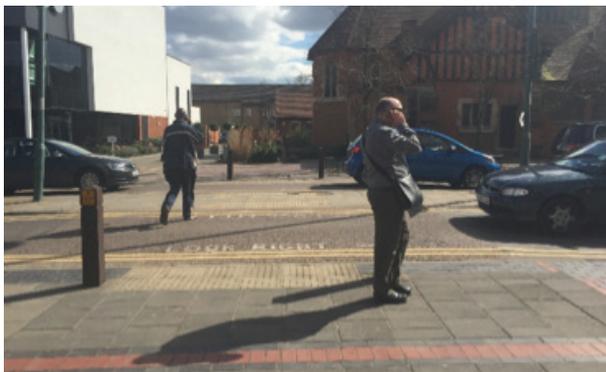
In the autumn of 2008, refurbishment works were undertaken on Shenley Road. The main alteration was the resurfacing of the raised tables in blacktop in place of the original red clay blocks to reduce maintenance works and the provision of improved tactile paving. Another significant improvement was the addition of energy-efficient street lighting, as well as other useful street furniture.

Aims

- **To improve pedestrian safety**
- **To reduce motor vehicle speed**
- **To reduce congestion**



Images – Present





2. Technical Data

Dates	The scheme was constructed as a temporary experiment in 1989. It was retained and extended in 1990/1 and was refurbished in 2008						
Cost	Refurbishment works in 2009: £790,000						
Traffic Volumes (January 17)	10,700 vehicles per day (7-day average) 800 vehicles, weekday peak hours						
Traffic Speed (January 17)	17 mph (average) 21.9 mph (85th percentile)						
Pedestrian Volumes	Not available						
Pedestrian Crossing Movements	Short period count by Crowd Dynamics in 2014 show approximately 100 per hour at 4 p.m. at one crossing						
Road Safety	<table border="0"> <tr> <td>1980 to 1989 (prior to construction):</td> <td>13.1 accidents/annum 2.0 serious accidents/annum</td> </tr> <tr> <td>1990 to 1999</td> <td>9.0 accidents/annum 1.1 serious accidents/annum</td> </tr> <tr> <td>2013 to 2015</td> <td>8.7 accidents/annum 0.3 serious accidents/annum</td> </tr> </table>	1980 to 1989 (prior to construction):	13.1 accidents/annum 2.0 serious accidents/annum	1990 to 1999	9.0 accidents/annum 1.1 serious accidents/annum	2013 to 2015	8.7 accidents/annum 0.3 serious accidents/annum
1980 to 1989 (prior to construction):	13.1 accidents/annum 2.0 serious accidents/annum						
1990 to 1999	9.0 accidents/annum 1.1 serious accidents/annum						
2013 to 2015	8.7 accidents/annum 0.3 serious accidents/annum						



3. Evaluations

This scheme has been evaluated under the following headings:

- Inclusive Environment
- Ease of Movement
- Improved Safety and Public Health
- Quality of Place
- Economic/Regeneration Benefits

Inclusive Environment

It has not been possible to obtain details of the highway layout prior to the construction of the original scheme, and it is therefore not possible to establish whether any signal-controlled crossings were removed.

During the improvement works in 2009, tactile paving at the informal crossing points was upgraded and higher kerbs were installed at the bus stops to comply with current design standards.

The level surfaces at the crossings are easy for wheelchair users to negotiate, who will therefore have benefited from the original scheme. No information on the usability of the scheme by visually impaired people has been identified.

Overall, while some groups have benefited from the changes made in 1989, it is not possible to make a firm assessment of the inclusivity of the environment without further information.

Ease of Movement

Shenley Road is a busy high street, which accommodates up to some 800 vehicles per hour (two-way). It is a high-frequency bus route, with around 16 buses per hour in each direction.

Raised tables, at an average spacing of about 70 m, sit at the same level as the footway, making it easy for people to cross, particularly wheelchair users and people with pushchairs. The crossing points are marked with tactile paving and wooden bollards. The bollards have small signs indicating that pedestrians should exercise caution when crossing, although there is no evidence that these influence behaviour. There is a central median strip, which further facilitates pedestrian crossing movements.

A high level of courtesy was recorded by Crowd Dynamics in a short count period (following the refurbishment works) at one of the crossing points during the afternoon peak, with some 80% of drivers ceding priority to pedestrians. It is encouraging that such a high level of courtesy was achieved despite the removal of the contrasting brick paving at the crossing points.



Previously, the crossing points were as in the foreground (a service road crossing); they are now as in the background, paved in asphalt.

The number of people using the crossing was some 100 per hour. Pedestrians could expect to wait an average 3 seconds before being able to cross the road, with a maximum observed delay of 7.5 seconds.

Video surveys of driver/pedestrian behaviour at the courtesy crossings were taken by Hertfordshire County Council before and after the refurbishment works, which found that vehicle speed had dropped because of the informal crossing points being more visible than before. There was also less illegal parking, meaning that all road users have a better view of the road. Hertfordshire reported that this had led to an increased likelihood of drivers yielding to pedestrians and the number of people being attracted to use the crossing points.



Previously the crossing points were as in the foreground (a service road crossing) – they are now as in the background, paved in asphalt

In terms of motor traffic, there is still congestion, although the change from traffic signals to mini-roundabouts at two junctions is thought to have resulted in less stopping and starting. Conditions for cycling are not particularly good, although the relatively slow traffic speed is thought to have some benefits.

Overall, the scheme is considered to have had a positive effect on ease of movement, particularly for pedestrians.

Improved Safety and Public Health

Vehicle speed tends to be low through the scheme, largely because of the slowing effect of the speed tables and congestion because of the high volume of traffic at peak times. Traffic speed was measured in January 2017 as 17 mph (average) and 21.9 mph (85th percentile).

Vehicles are seen to slow on approach at the courtesy crossings because of the change in level. Congestion was highlighted as an issue through Borehamwood Town Centre in the 2007 and 2013 Borehamwood and Elstree Urban Transport Plans.

Historic accident data has been provided by Hertfordshire County Council, which shows that in the 10 years prior to the scheme being constructed in 1989, there were an average of 13.1 recorded accidents per year along the route, of which 2.0 involved serious casualties. In the 10 years after construction, recorded accidents dropped to an average of 9.0 per year, of which 1.1 were serious.



In the 3 most recent years for which complete data is available (2013 to 2015), there were 8.7 accidents per year on average, of which 0.3 were serious.

This indicates that the accident record along Shenley Road was improved by the construction of the scheme and that these benefits were retained following the changes made in 2008.

It is thought that the road safety benefits are largely caused by the reduction in traffic speed following the introduction of the flat-top humps. The lower speed and smoothing of traffic flow are thought to likely improve air quality and noise levels.

Quality of Place

While the principal aims of the original scheme were to improve road safety and reduce speed, there was also a desire to improve the appearance of the area through a reduction in street clutter and the use of better-quality materials. The scheme was the winner of an Urban Street Environment Traffic Calming Award in 1994.

Some 25 years on, there has been a slight loss of quality, partly through the repaving of the raised tables in asphalt and through the addition of some traffic signs and road markings, but the area is still more attractive and welcoming than many urban high streets. People have been observed spending time in the area, sitting on the frequent public benches and at outside tables at cafes.

It is therefore considered that the scheme has had a positive effect on the quality of place.

Economic Benefits

Shenley Road is a significant local shopping area, and local businesses appear to be trading very successfully, with very few vacant units. Property investment is taking place, with new retail space in Borehamwood Shopping Park and fronting onto Shenley Road planned to open in August 2017.

There are a number of marked bays for short-term car parking and unloading only. Disabled car parking bays are also provided and are raised to kerb height for ease of entry and exit from the vehicle. There are around 20 cycle racks along the length of the Shenley Road scheme.

Considering the age of the scheme, it is not possible to assess in any detail how the scheme will have affected the local economy, but the improvement in the appearance of the area and the ease in which people can cross the carriageway is likely to have benefited businesses along Shenley Road.



4. Conclusions

A summary of the impacts of the scheme for each of the five evaluation criteria is as follows:

Key:

+ve	Neutral	-ve	Insufficient information
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Inclusive Environment

Insufficient information

No factual data is available on the use of the street by people with impaired mobility, nor their attitudes to the scheme. People using wheelchairs are thought to have benefited from the regular-level crossing points, but the usability of the street by visually impaired people is not known.

Ease of Movement

+ve

The Shenley Road scheme significantly improved ease of movement for pedestrians. The frequent raised tables work effectively in slowing traffic and create obvious crossing points from both the pedestrian and driver points of view, with high levels of driver courtesy shown. While there is still some congestion, the scheme will have resulted in less stopping and starting. Conditions for cycling are not particularly good, however.

Improved Safety and Public Health

+ve

The scheme was successful in improving road safety, and it is thought that this was caused by the reduction in traffic speed. This and the smoothing of traffic flow following the removal of two sets of traffic signals would also have tended to improve air quality and noise levels.

Quality of Place

+ve

Although no details have been obtained of Shenley Road prior to the scheme being introduced in 1989, the description of the works and the positive reports in previous studies demonstrate that the scheme has achieved a substantial improvement in quality of place. Considerable street clutter was removed, and the footways were widened and paved in higher-quality materials. Lighting was improved (and again, more recently), and a large number of trees and shrubs were planted. Some of the original paving blocks in the carriageway have had to be replaced, however, which has led to some loss of quality. There is evidence of significant levels of place activity.

Economic Benefits

+ve

The shopping area appears to be popular and trading well, with few vacant units and property investment continuing to take place. From the descriptions of the positive changes made by the scheme, it is expected that it will have contributed positively to the local economy.



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