Planning for Walking

Contents

1. Introduction

After driving and being driven, walking is the most common form of travel in Britain. It accounted for 22% of all journeys in 2012 (National Travel Survey [NTS], Department for Transport [DfT, annual]). At approximately 200 journeys per person a year, walking is remarkably constant from cities to small towns. Only in rural districts do people walk significantly less than this.

People do, however, make fewer short journeys by all modes than they used to. This is partly because an increasing proportion of people live in suburbs where useful destinations are rarely close. It is also because rising car ownership has enabled people to go further and explore more choices to satisfy their wants and needs. As a result, walking has been declining, although the reduction in the number of walk journeys stopped in 2007.

Key points:

- Patterns of land use and, in particular, residential densities and mixed uses are the primary determinants of how much people walk. As towns and cities spread out, people make fewer short journeys. The current trend to higher density for new residential developments should encourage walking, if linked to provision of local destinations.
- Most short journeys are still made wholly on foot.
- Walking is also part of longer journeys. Very few trips by car or public transport are completed without some walking.
- Pedestrian "footfall" determines the viability of shops.

Other points are also worth stressing:

- Walking contributes to physical and mental health.
- All streets in urban areas need to be designed to accommodate people who walk wherever they wish to go
- People travelling on foot want routes that are direct, as level as possible, enjoyable and have destinations in sight. Safe road crossings are an essential element of routes.
- "Walking" is best thought of as a nonvehicle movement including all forms of assistance, such as sticks, wheelchairs, baby buggies and pavement vehicles. Good provision for users requiring such forms of assistance helps everybody.
- Walking and cycling are often regarded as compatible. In reality, they are very different modes that will often require separate provision. Both benefit from reduced traffic speeds and reduced motor vehicle traffic flow.

- The issue of pedestrians and pedal cyclists sharing space is contentious. There are perceived risks associated with cyclists sharing space with pedestrians, and it is not always realised that cyclists seriously injure several hundred pedestrians each year.
- Planners and traffic managers should appreciate that to encourage walking, motor vehicle traffic rather than pedestrians should, as far as possible, be required to avoid conflicts by diverting from direct routes and by changing elevation. Pedestrians wish to follow direct routes on a constant level.

The Welsh Government is promoting active travel and has passed the Active Travel (Wales) Act 2013. This act created new duties for local authorities in Wales and the Welsh ministers and also gave the Welsh ministers the power to issue guidance on the location, nature and condition of active travel routes and facilities to ensure they are suitable for use. This is supported by design guidance (Welsh Government, 2014).

York pedestrians

This Chartered Institution of Highways and Transportation (CIHT) guideline *Planning for walking*

- describes the characteristics of pedestrian journeys,
- lists the benefits of walking,
- identifies factors that discourage walking and how they can be overcome,
- summarises the legal framework that applies to pedestrians and
- outlines the way that plans and strategies for pedestrian travel are developed.

These guidelines are designed to address the limited amount of guidance available to professionals about planning for walking. Some of the research quoted is quite old but is still valid and does in itself indicate that more work is needed in this area (and is something that CIHT will be taking forwards). As it is a web-based publication that can be modified relatively easily, CIHT would welcome examples that build on the content of this guidance for inclusion in further guidance on the subject.

In terms of finding more up-to-date examples,

- the authors and reviewers of this draft are not aware of more recent examples, and have included the best examples they are aware of. CIHT would welcome further examples to include in future editions;
- comments and examples should be forwarded to CIHT for use in future updates of the guidance, after consideration by the Working Group on Walking that CIHT has set up to address the topic more proactively; and
- CIHT plans to also take the published version of the guidance to a wider group of members who have identified themselves as being interested in sustainability issues.

This guideline is complemented by another CIHT document, *Designing for walking* (CIHT, 2015), which covers the design and evaluation of facilities for pedestrians.

York pedestrians

2. Walking Characteristics, Behaviour and Trends

2.1 How much do people walk?

Across Britain about 80 per cent of journeys shorter than 1 mile are made wholly on foot – something that has changed little in thirty years. In 2012 walkers accounted for 79 per cent of all journeys shorter than 1 mile, but beyond that distance cars are the dominant mode (DfT, annual)*. In contrast, in 1972/73, 85 per cent of journeys shorter than 1 mile were made on foot.

For journeys that are 1 to 2 miles long, 26 per cent are made on foot (NTS 2012), more than by bus; beyond 2 miles, trips on foot are few and are outnumbered by bus trips.

The main reason for the decline in pedestrian journeys is the fall in the total number of journeys shorter than 1 mile (Figure 2). It is not that people are less likely to make short journeys on foot, but rather that fewer of the journeys they make can be accomplished on foot. Another way of putting this is that the destinations people want to reach are now further apart.

The number of trips per person per year shorter than one mile fell from 335 in 1985 to 187 in 2007, since when it has been steady at between 187 and 198 per year (Figure 2). Trips on foot of all lengths per person per year declined from 350 in 1985 to 216 in 2007, since when it has been between 210 and 228 per year.

Over the same period the average length of pedestrian journeys increased slightly from 0.7 miles to 0.85 miles, and the average duration increased even more marginally from 15 minutes to 17 minutes (speed has increased slightly to 3.0 mph).

In 2012 in all types of urban areas, people made between 196 and 252 pedestrian journeys a year. Size of settlement made little difference and even in rural districts – communities with fewer than 3,000 residents - people averaged 147 walk trips a year (Figure 3).

2.2 Why do people walk?

Historically the most common reason for walking was to go shopping, but the number of shopping trips has declined sharply over the past two decades, roughly halving in number. Now, approximately equal numbers of walk trips are made for shopping, leisure, education and education escort, and going for a walk/or other. Roughly half this number of trips is made for commuting and business purposes (Figure 4).

For most journey purposes, the percentages made on foot have declined slightly since 1985. The exceptions are trips for 'commuting and business' and 'other' purposes. Aside from 'other' walk trips, the highest share by foot, about 35% to 40%, is for education, personal business and associated escort trips.

2.3 Variations by age and gender

The amount people walk varies with age and gender, as well as with social class and place of residence. Walking is also affected by peoples' disabilities which, likewise, vary with age and gender.

Figure 1: Percentage of journeys on foot 1972/73, 1994/96 and 2010 (National Travel Survey; DfT, annual)
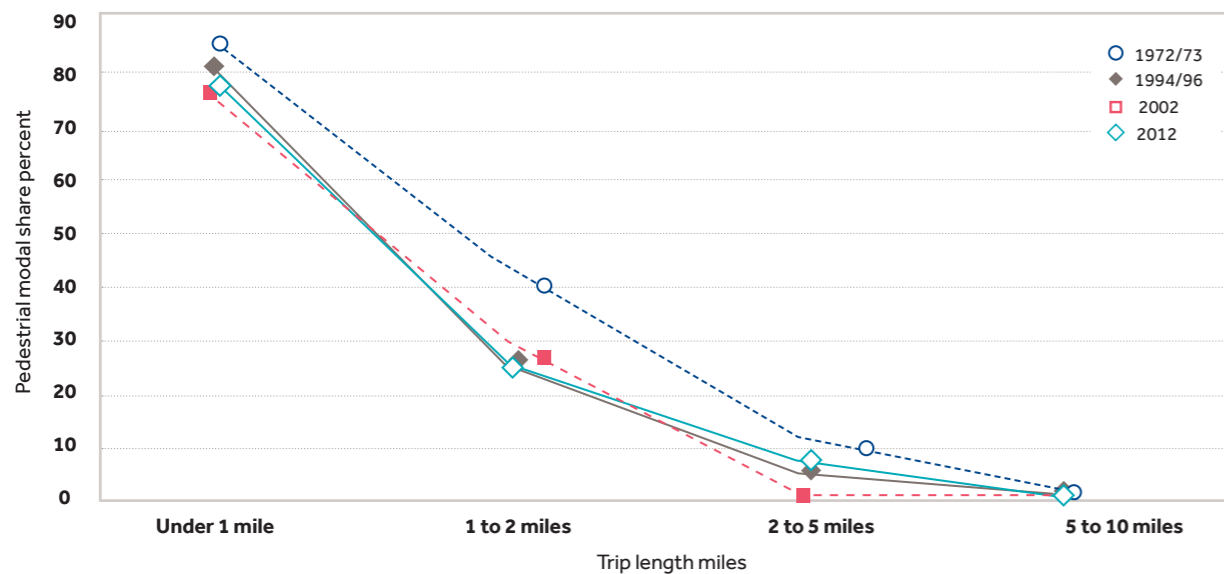
*The 2013 National Travel Survey only covered England. To provide continuity in time series, data from it have not been used in this guideline

Figure 3: Journeys per year by non-car modes in different types of area, 2012 (National Travel Survey 2012; DfT, annual)
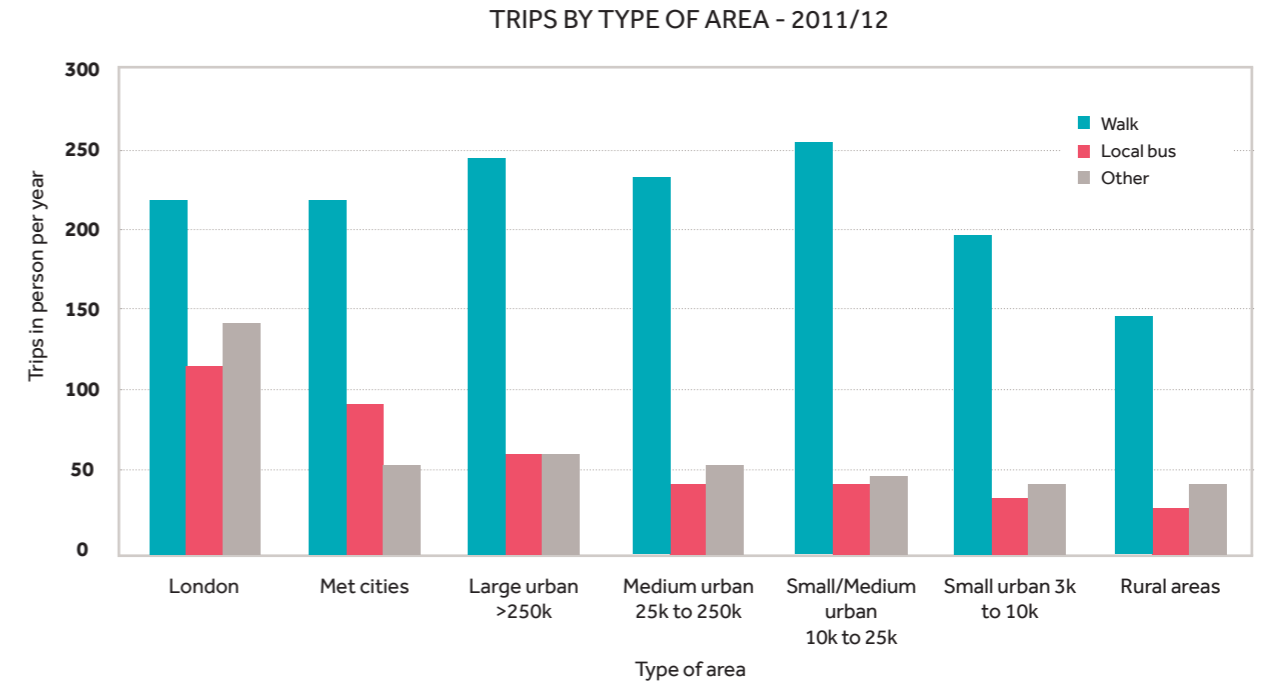

Figure 2: Trend in the number of journeys of different lengths, Great Britain (National Travel Survey; DfT, annual)
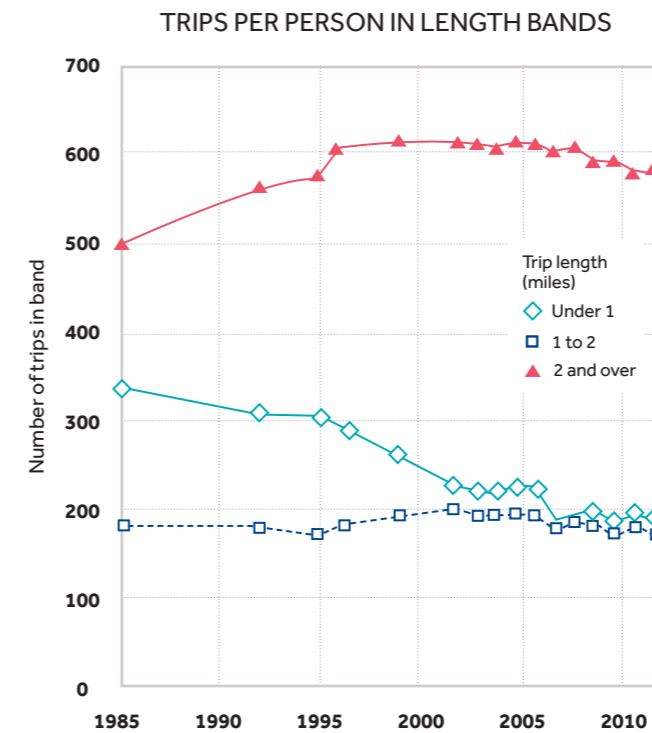

Figure 4: Walk trips by purpose (National Travel Survey; DfT, annual)
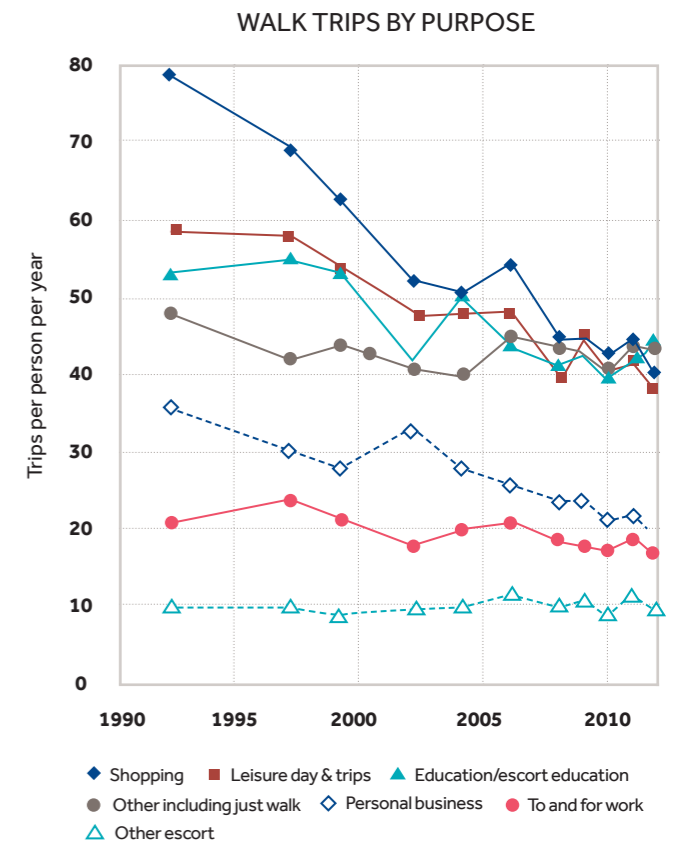
Dropped kerb

As people age, they walk less. For men, average walk trip rates decline from mid-teens to mid-forties, when they stabilise; for women, trips also decline from mid-teens, but increase again in their thirties, but thereafter show a steady decline with age. As a consequence, while women make more walk trips than men at most ages, above 65 women make fewer such trips. Similar trends are apparent for average walk distances per year, although here there is a steady decline from age 20 (Figure 5).

2.4 Many find it difficult to walk

Over the whole population, approximately 15% of people, most of them elderly, have an impairment that affects their mobility. Figure 6 shows how the percentage of people with a mobility difficulty increases with age, reaching over 35% for people aged 70 and over. At all ages, more women report a mobility difficulty than men.

A more detailed breakdown by age of the percentage of people with disabilities is available in the Family Resources Survey 2012-2013 (DWP, 2014), but this shows all disabilities, not only those specifically related to mobility. It demonstrates how rapidly disabilities increase as people age past 75 or so. More detailed, though older, studies show that, of people with mobility difficulties, about 70 per cent have difficulties walking, climbing and balancing, (Martin et al, 1988). They show too that about half of people with mobility difficulties are able to get about on their own, provided all pavements and public transport vehicles are appropriately designed (General Household Survey 1998). Martin et al (1988) estimated that 6.2 million adults could not walk 400 yards without a rest, and 3.4 million could not walk 200 yards without stopping or severe discomfort.

Figure 5: Effect of age and gender on number of pedestrian journeys and the distance travelled on foot 2012 (National Travel Survey 2012; DfT, annual)

Figure 6: Percentages of people with mobility difficulties (National Travel Survey 2012)
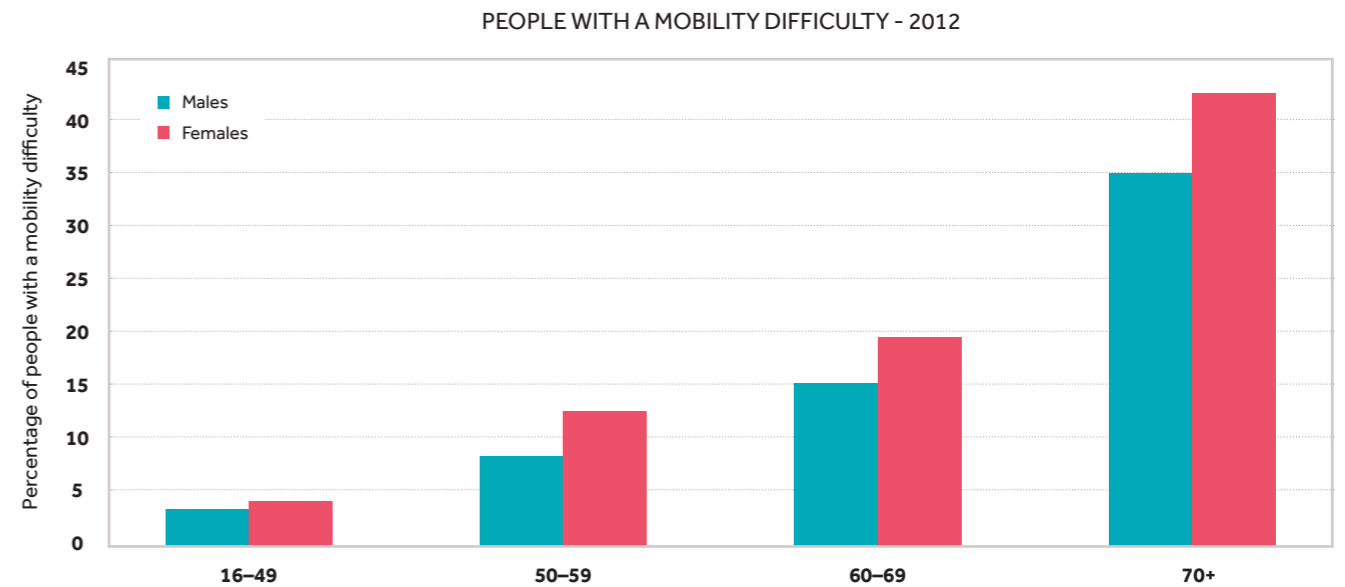
This explains the need for frequent seats or resting places where people walk.

Although this, and many of the other references cited in this guideline, date from some time ago, the information or advice quoted is still valid and has not been superseded by anything more recent.

People with mobility difficulties use a variety of aids to walking. By far the most common are sticks, which account for about 69 per cent of all aids. The number of mobility scooters is increasing rapidly, with an estimated 300,000 in use in 2011. They are mainly used for journeys of up to 3 miles in good weather, and in many cases provide mobility for older people after they stop driving. Such scooters need to be considered in transport planning and in the design of pedestrian areas.

Table 1: Type of mobility aid as a percentage of all mobility aids

Type of mobility aid	Percentage of all mobility aids
Walking stick	69
Crutches	8
Walking frame/tripod/zimmer	8
Trolley	2
Manual wheelchair	9
Electric wheelchair	2
Mobility scooter	2

General Household Survey 2001, Table 10.9

Mobility scooter

3. Benefits Of Walking

3.1 Health

Walking more offers benefits such as improved health and a reduced risk of obesity. The World Health Organisation (WHO) has published 'Health economic assessment tools (HEAT) for walking and for cycling' (WHO, 2014). An extract states:

The nature of the relationship between physical activity and health

Epidemiological studies report relationships between different categories or levels of exposure and health outcomes. For example, a comparison of sedentary people with people who are active beyond a specific threshold (such as 150 minutes of activity per week) may show that active people are healthier. However, there is a strong consensus that physical activity has a continuous dose–response relationship with most health outcomes, i.e. each increase in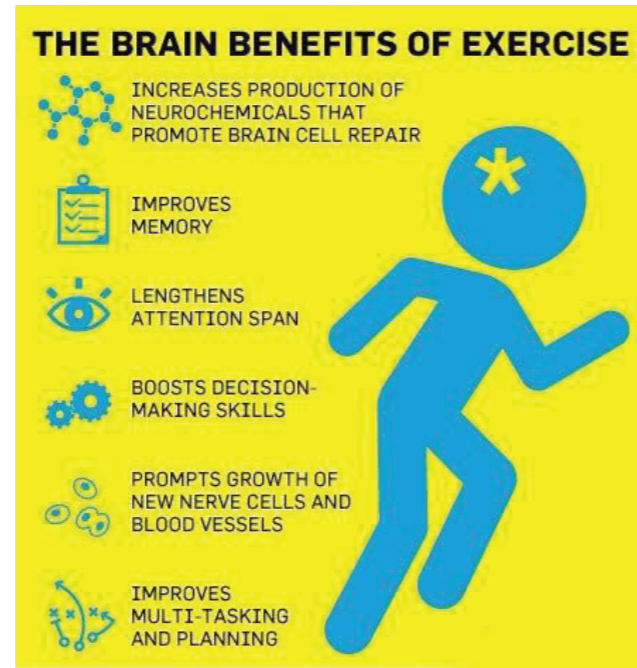 physical activity is associated with additional health benefits. This has also been shown by studies looking specifically at walking or cycling.

THE BRAIN BENEFITS OF EXERCISE

- INCREASES PRODUCTION OF NEUROCHEMICALS THAT PROMOTE BRAIN CELL REPAIR
- IMPROVES MEMORY
- LENGTHENS ATTENTION SPAN
- BOOSTS DECISION-MAKING SKILLS
- PROMPTS GROWTH OF NEW NERVE CELLS AND BLOOD VESSELS
- IMPROVES MULTI-TASKING AND PLANNING

Sheffield, Heart of the City

Background

In the early 1990s, Sheffield faced a number of challenges, not least the decline in steel and engineering industries and the opening of Meadowhall, a regional shopping centre on the outskirts of the city. The Council had to rethink what the city offered in order to bring investment, employment and visitors back into the centre.

Intervention

The Heart of the City project was the first in a succession of regenerations (that now make up the Gold Route) designed to welcome visitors to the city. Phase One was completed in 1999 with the delivery of three key improvements to the public realm: the reconstruction of the Peace Gardens; the realignment and narrowing of Pinstone Street to create a new event and gathering space outside the Town Hall (the new Town Hall Square) and the narrowing of the carriageway in Surrey Street to give pedestrians more space.

Outcome

An evaluation of the improvements to Peace Gardens reported a 35% increase in footfall in the city centre. The authors estimated an attribution rate of 20% to 44% or a net increase of visitors of 350,000 to 770,000 and a net increase in spending of £4.2 m (based on 7% attribution of additional spend of £12.20 per visitor). Reported regeneration outcomes included an increase of £1.60 to £2.40/sq. ft. rental value and the creation of 341 to 527 additional net jobs (ibid.).

Sheffield Peace Gardens

Photograph: Dennis Lound

The Grassmarket, Edinburgh

Background

The Grassmarket is located south of Edinburgh Castle in the historic centre of the city. By the mid-2000s, negative perceptions of the area associated with nighttime drinking and antisocial behaviour, dominance of vehicles and the gradual decline in the public realm all needed to be addressed. Engagement between Edinburgh City Council, businesses, residents and traders identified opportunities to provide a quality setting for the Grassmarket's historic buildings, enhance its retail vitality and introduce daytime activities attractive to a wide range of people.

Intervention

Over £5 million was set aside to redesign the streetscape, improve linkages to other districts and establish a pilot events programme for the year. Space was redistributed from vehicles to pedestrians to allow flexible use for events, such as markets, films, dance events and concerts. Work was completed in 2009. Public realm improvements of £3.87 million included the relaying of 40,000 m2 sets, together with 5,000 m2 new Caithness Flagstones, new street lighting (and CCTV) and underground recycling units. This was complemented by, for example, the planting of semimature trees and the refurbishment of listed buildings and monuments.

Outcome

One of the lessons learned was the importance of engaging with the community. Since completion, the Grassmarket has seen a wider range of business uses. It has also seen an improvement in its road safety record. However, the public realm is underused. In its business plan (2013–2018), the new Greater Grassmarket Business Improvement District (BID) proposes to use the space for events and markets. This underlines the importance of active management as part of regeneration.

A short summary of the public realm improvements can be found at: www.scotland.gov.uk/Resource/Doc/212607/0114309.pdf.

The scheme cost is given at www.rjmcleod.co.uk/archived_projects/streetscaping/grassmarket__edinburgh/.

The Greater Grassmarket BID business plan is at www.grassmarket.net/files/Greater%20Grassmarket%20.

The pedestrian pound

Photograph: Living Streets (2013)

Waterloo Hotspot Congestion Relief pilot

Many visitors to London, and indeed, Londoners, don't realise how close many parts of the city are to one another. For instance, someone arriving at Waterloo station takes about 15 minutes to walk to Westminster or Covent Garden and around 25 minutes to reach the heart of the city.

To help people understand how many places are walkable from Waterloo, and to reduce the number of short trips made by bus and tube, TfL undertook a walking promotion experiment.

This project ran between September 12 and 23, 2011, and was supported by Network Rail and South West Trains.

The aim was to encourage people to walk from Waterloo to their destination instead of using the bus or tube.

Staff, based at the station every weekday from 7:00 a.m. to 10:00 a.m. handed out bespoke Legible London walking maps, showing destinations that could be reached within 20 minutes.

Posters and messages were also displayed at station exits to draw attention to the idea of walking and encourage people to consider making trips on foot.
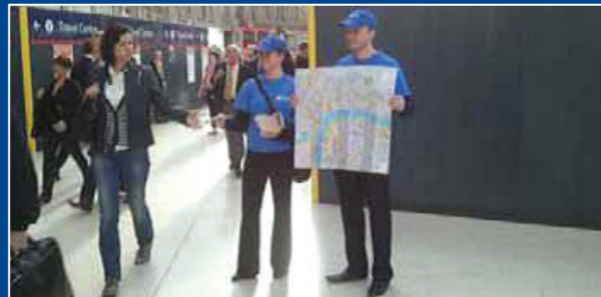
Staff handing out Waterloo walking maps

During the fortnight pilot, 54,325 maps were given directly to the public. Additional maps were supplied to South West Trains and Network Rail for them to give out.

Summarised from Transport for London, Walking Good Practice, version 4, April 2012, page 35

Monitoring travel to and from Waterloo after pilot showed that walk trips had increased by 6%.

However, walk trips not involving Waterloo by the participants when interviewed at Waterloo had also increased, so there did not appear to be a selective increase in walk trips with a Waterloo trip end. Also, there did not appear to be a relationship between recognition of the publicity campaign and increased walking levels.

A recent study of over 334,000 European men and women found that twice as many deaths may be attributable to lack of physical activity compared with the number of deaths attributable to obesity, but that just a modest increase in physical activity could have significant health benefits (Ekelund et al, 2015). A brisk 20 minute walk each day could be enough to reduce an individual's risk of early death.

An Australian study found that those who walked for recreation for more than 8.6 minutes per day were 72% more likely to report better physical health and 33% more likely to report better mental health than those who walked less. This is cited by Living Streets in 'Making the case for investment in the walking environment – a review of the evidence' (Living Streets, 2011a).

Advice from the Department for Transport includes estimates of the health benefits of walking and other physical activity (TAG UNIT A5.1 Active Mode Appraisal, January 2014, section 3.2 Physical Activity Impacts. (DfT, 2014a). (This supercedes Guidance on the Appraisal of Walking and Cycling Schemes TAG Unit 3.14.1, January 2010, Para. 1.10.1.)

3.2 Economic benefits

The economic benefits of a good-quality pedestrian environment include increased property prices and greater pedestrian footfall, leading to increased retail turnover. Examples are as follows:

- **The sale price of flats in London was significantly greater in areas with higher quality pedestrian environments (all other factors being considered) (MVA. 2008).**
- **Exeter has revitalised its city centre with improvements to the public realm. The pedestrian environment has been improved by the removal of**

vehicle traffic, traffic management and an increase in pedestrian and shared spaces (Living Streets 2011a). As a result, there has been:

- An increase in footfall of around 30% between 2002 and 2010
- A small increase in the retail rents between 2006 and 2008 compared with declining rents in other towns in the region; however, this may reflect a national trend for shoppers to migrate from smaller towns to regional centres that offer greater choices.

Another report, "The pedestrian pound: The business case for better streets and places" (Living Streets, 2013), focuses on town centres and high streets and presents evidence for a commercial return on public realm investments. A typical example is the Sheffield Heart of the City Project (see box on the previous page).

Modelling the effects of improvements to Manchester's city centre found small, but significant, positive effects for businesses and workers. The results suggested that the favourable effect of environmental improvements might be comparable to those expected from improved public transport. Case studies from other English cities also illustrate or predict benefits. In Coventry, for instance, new pedestrian areas, a new civic square, clearer signage and better placement of street furniture in the centre were credited with a 25 per cent rise in footfall on Saturdays.

In Bristol, where the Broadmead Business Improvement District was set up in 2005 to create a better shopping environment and a seamless transition between the new and existing retail areas, the benefits of the proposed scheme were forecast for 10 years. This analysis predicted that the improvements would generate benefits worth £1.4 million to shoppers and passersby.

In London, Wanstead High Street achieved an average increase of 98 per cent in pedestrian numbers after enhancing the walking routes between its two stations, the bus terminus, school, library and high street (Living Streets, 2013).

Evidence also suggests that pedestrians and cyclists spend more than people arriving by motorised transport. In a 2009 study of Bloor Street, Toronto, people who cycled and walked reported that they spent more per month than those who arrived by car. In 2011, a similar study in London found that while car drivers spent more on a single trip, walkers and bus users spent more over a month; £147 more for walkers than for those travelling by car (Living Streets, 2013). A study of the effect of improvements for pedestrians in Takapuna in Auckland, New Zealand, found that afterwards although shoppers spent similar amounts per trip, the increase in spending

by those on foot was approximately $80 per month, six times more than the increase for those in cars.

Other evidence indicates that improving conditions for pedestrians in town centres can encourage urban regeneration by stimulating and supporting new markets and enterprise (see box below). Whilst it is not conclusive, there is evidence that redevelopment, such as the creation of 'cultural quarters' or 'waterfront developments', also coincides with large increases in new business.

3.3 Relieving public transport

Encouraging walking can be an effective way to help relieve congestion on public transport. Transport for London (TfL) estimate that around 180,000 bus trips in central and inner districts and 130,000 in outer ones could be made on foot (TfL 2012).

Surveys of passenger leaving rail termini in London in 2010 showed that 125,000 of them made onward journeys by bus, underground and light railway that were shorter than 2 km. These people accounted for 19 percent of all onward passengers. An example of a TfL project at Waterloo station to raise awareness and to encourage people to abandon short distance car and public transport trips in favour of walking is shown in the box on the left hand page.

During the 2012 Olympic Games, TfL ran a campaign encouraging people to walk and free up public transport for those attending the Games. The campaign had some success, particularly with commuters arriving at main line stations, in persuading them to walk.

Transport for monitored the change in travel behaviour by London residents, workers and regular visitors that facilitated the reduction in background demand witnessed during the Games. Background demand, in other words, normal travel not related to the Games, reduced by five per cent on an average day during the Olympics and three per cent during the Paralympics. Across the two weeks of the Olympics, more than three quarters of the London travelling population made some sort of change to their travel patterns as a result of the Games and just 23 per cent continued to travel as normal. In total:

- **63 per cent reduced their travel;**
- **28 per cent changed the time of their journeys;**
- **21 per cent changed route; and**
- **19 per cent changed mode.**

While the goal of the Travel Demand Management (TDM) Programme was to change travel during the Games, it was anticipated that the Games may result in some sustained changes in travel patterns. 15 per cent

of regular travellers who made a change to their travel during the Games have continued with that change, equivalent to around one in ten (11 per cent) of all regular London travellers.

A series of stations were identified as 'hotspots' during the Games, stations that would be exceptionally busy during the Games. In general, the travel behaviour and choices of commuters through the hotspot stations was similar to all commuters. The vast majority had expected their station to be busier than normal and as a result nearly all had thought about how they would travel during the Games, although many decided to wait and see what happened before committing to a change.

Transport for London concluded that the change would not have taken place to the same extent without TDM – those who were aware of the "Get Ahead of the Games" campaign and tools were more likely to change. Businesses used the information provided by TfL to get senior level buy-in and allocate resources. The awareness of and engagement with the campaign undoubtedly contributed to the preparedness of London travellers for the Games, and the level of change in travel behaviour seen throughout the Games.

The TDM approach used for the Games can be usefully applied to situations where travellers face a major change to network supply or demand, such as a line or station upgrade or a major event.

3.4 Walking improves air quality
As road traffic is responsible for about 70% of the three most dangerous pollutants (nitrogen dioxide, particulates and ozone), such emissions and noise pollution are cut if the use of cars can be reduced. Short car trips contribute relatively more pollution, due to cold starts, and so encouraging a switch from car to walk is particularly beneficial.

4. Current Conditions and Challenges

4.1 Problems faced by pedestrians
Where walking conditions are less than ideal, pedestrians face challenges caused by a combination of poor planning for pedestrians, poor maintenance and management of pedestrian routes, conflicts with motor vehicles and lack of personal security, the last possibly increased by the recent trend to reduce street lighting or turn off lighting part way through the night.

The box below gives a list of problems faced by pedestrians, from the CIHT guideline *Providing for journeys on foot* (IHT, 2000a).

Pedestrians' common concerns can be judged from research, undertaken for Living Streets in 2012, which asked Welsh adults which, if any, of the following problems they had encountered on their local streets (Table 2).

Table 2: Problems encountered by pedestrians (2012)

Problem	Percentage
Litter or dog fouling	76
Broken or cracked pavements	66
People parking on the pavement	62
Potholes in pavements	58
Pavements that have been badly patched up after street works	54
People cycling on the pavement	53
Fly tipping, graffiti or abandoned cars	41
Street clutter and/or obstructions on the pavement	39
Badly managed street works	32
Street lighting not working/not enough street lighting or street lighting being turned off or removed	23

Source: Welsh Government (2014) Design Guidance p.24

The NCC report 'What's wrong with walking?' (NCC, 1987) ranked a range of pedestrian concerns, most of which result from poor street management. Dog and animal fouling, badly maintained paving and domestic litter were all major concerns, as was parking cars and bicycles, and riding bicycles, on footways. Little appears to have changed between 1985 and 2012.

The CIHT guidelines *Providing for journeys on foot* (IHT, 2000a) reports on many real or perceived deterrents to walking. Some of the less obvious problems are listed in the box overleaf.

Problems faced by pedestrians

A Poor-quality Pedestrian Environment
- inadequate footway maintenance/ reinstatement and lack of snow clearance and deicing
- litter and a general appearance of neglect
- dog fouling
- splashing by drivers
- buildings that turn their backs on the street and present pedestrians with blank walls, ugly street scenes and an absence of reassuring surveillance
- cul-de-sac housing layouts that turn suburban estates into mazes and increase walking distances to shops and other local services
- lack of benches and public lavatories
- the absence of road signs for visitors on foot
- steep gradients and/or steps

Inadequate Pedestrian Safety
- fear of road accidents
- aggressively designed vehicles and, at night, high-powered headlights
- obstructions on footways: roadworks, rubbish bins and sacks, poorly sited traffic sign poles, bus shelters, locked bicycles and parked cars

- inadequate or broken street lighting in residential streets and at pedestrian crossings on main roads
- lack of or inadequate footways, particularly in and between villages and the narrower streets of old towns and cities
- illegal cycling on pavements and the sharing of some off road paths with cyclists
- inadequate green time at signal-controlled crossings

Inadequate Personal Security
- graffiti, fear of assault and the withdrawal of police from local streets
- highly publicised child killings and abductions that have made some parents fearful of letting children walk unaccompanied
- dangerous dogs
- the presence of beggars (some of them aggressive) and intimidating drunks

Source: MORI (1986) and National Consumer Council (1987). Cited in IHT 2000 (edited)

4.2 Road safety and fear of traffic
The risk for pedestrians of being involved in road accidents can be measured in three ways: the number of pedestrian casualties, the casualty rate per passing vehicle and the casualty rate per distance walked. By all three measures, pedestrian safety has improved greatly in the past 20 to 40 years (Figures 7, 8 and 9, derived from Reported Road Casualties Great Britain, DfT, annual). Pedestrian deaths declined from approximately 3,000 in 1970 to approximately 400 in 2013.

Another risk to pedestrians is from tripping or falling on pedestrian pavements. These incidents are not recorded as transport accidents, and no central statistics of them are kept. The NCC report cited above (NCC, 1987) quotes from mortality records for England and Wales that in 1984, 189 people died in "street and highway accidental falls." It also includes two surveys, by MORI and by Consumers' Association, which asked about pavement accidents in the preceding 12 months. Approximately one in five respondents in the MORI survey had experienced a pedestrian accident; 7% had tripped or fallen, 11% had tripped or slipped on wet leaves, snow, ice or rubbish and 3% had walked into overhanging obstructions. NCC estimated that 2.3 to 3.4 million people were injured annually by pavement

Photograph: Living Streets

Poor quality pavement

trips or falls, and that approximately 2½ times as many people required inpatient medical treatment for trips and falls as did for pedestrian accidents involving a motor vehicle (Table 3).

Table 3: Treatment needed by accident victims (CA survey)

Cause of injury	Inpatient	Outpatient	GP
Trip/slip	30	247	178
Motor vehicle	13	16	12

Source: What's wrong with walking, table 3.4 (NCC, 1987)

Risk of injury from collisions increases with age

data on the age and gender of victims, the locations of collisions (by class of road and nearness to a crossing) and the type of vehicle involved. Figures 10a and 10b show the fatal and all severity casualty rates for pedestrians by age group. Older people have a much higher death rate than younger people but a more typical rate for casualties of all severities. Over 40% of pedestrian deaths are from the 23% of the population aged 60 and over. The high fatality rate is because people become more fragile as they age. If in an accident, they are more likely to suffer injury; if injured, they are more likely to die. For pedestrians in their 30s, approximately 2% of casualties die; in their 70s, approximately 6%; and by the later 80s, approximately 10%.

For all age groups, casualty rates have declined over the past 30 years, particularly rapidly for those aged 60 and over. More men than women die while walking, and this gender imbalance also applies, to a lesser extent, to all severities of injuries (Figure 11).

The large majority of pedestrian casualties occur in built-up areas, because that is where most walking happens. In 2013, half of the urban collisions with pedestrians that were fatal occurred on A roads (124 of 250), 37% of serious injury collisions were on A roads (1,633 of 4,412) and 34% of slight injury collisions were on A roads (7,236 of 21,198) (RRCGB Table 10011).

Vehicle types involved in collisions with pedestrians

Cars are involved in about three out of four collisions with pedestrians, Table 4 (overleaf). Cyclists were involved in six fatal accidents with pedestrians in 2013, about double the average for the past few years. Although pedal cycles were reported as involved in about 100 serious injuries to pedestrians, a DfT study of under-reporting (DfT, 2006) suggests that such injuries are being under-reported by a factor of four, and that between 1996/97 and 2002/03 cyclists were involved in about 200 serious injury collisions with pedestrians annually. Between 2005 and 2012, about 58% of pedestrian deaths and 45% of injuries involving cyclists occurred in the carriageway, not on a crossing. Nine serious injuries in 2013 involved a mobility scooter.

Figure 7: Pedestrian casualties, Great Britain (Reported Road Casualties Great Britain, DfT annual)

PEDESTRIAN CASUALTIES - GREAT BRITAIN
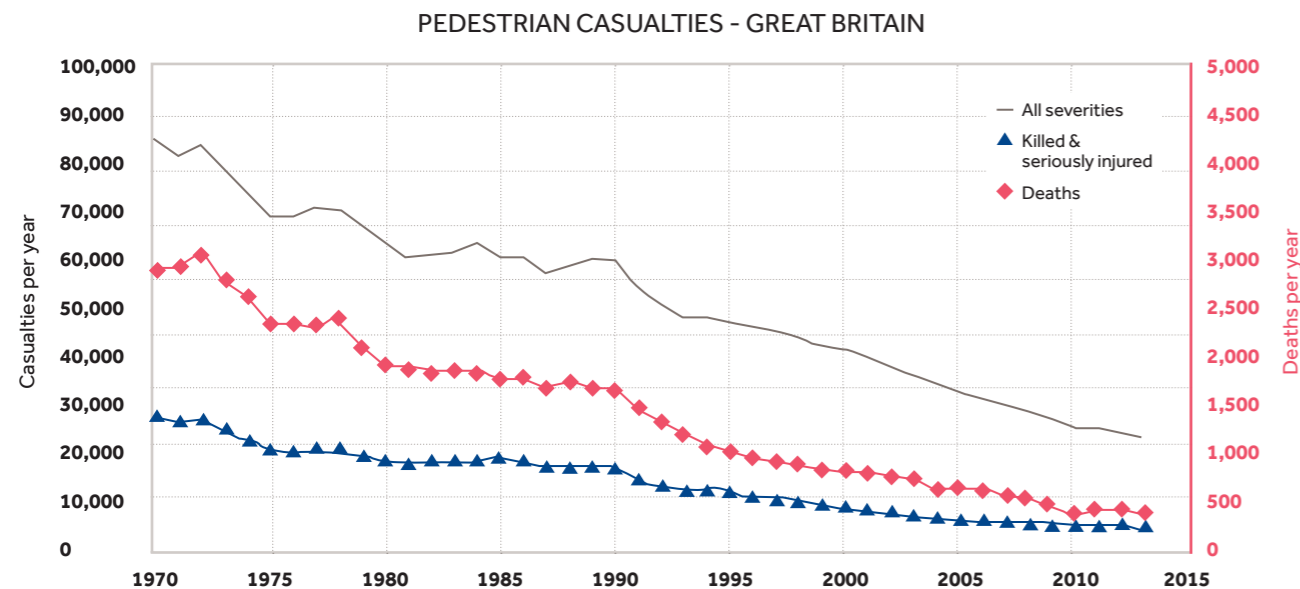
Figure 8: Pedestrian casualty rate per unit vehicle traffic, Great Britain (Reported Road Casualties Great Britain, DfT annual)
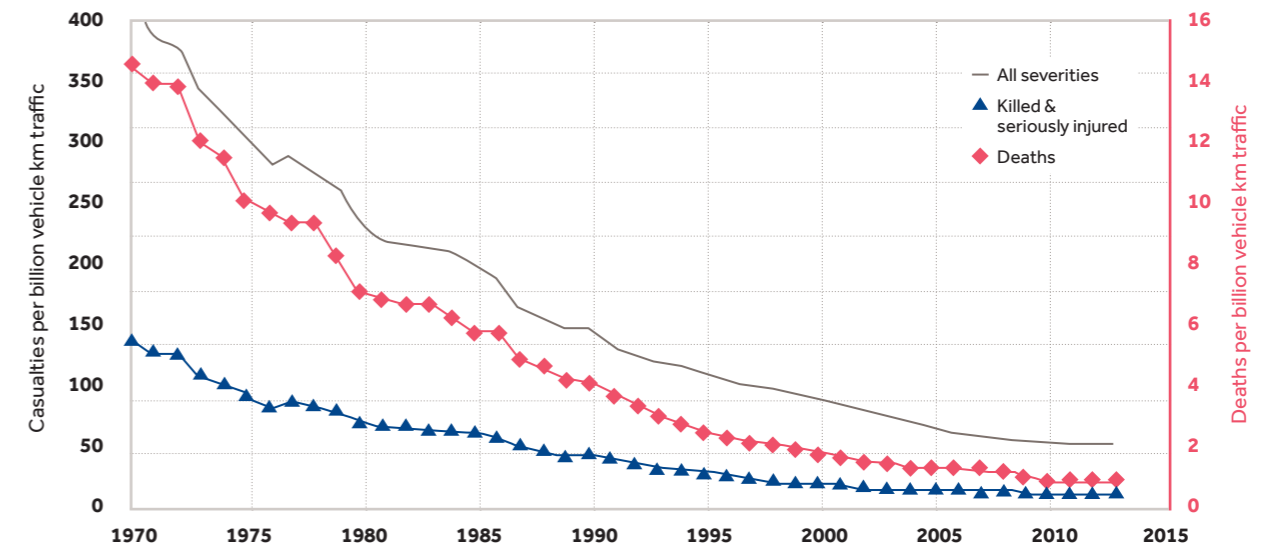
Some less obvious problems for pedestrians

- In the Bypass Demonstration Project Towns, the presence or absence of seating, as well as seating design, were key factors in determining the distance which elderly people were able to walk. If they could rest for a while en route, especially on a comfortable seat, they could walk much further.

- In the Gloucester Safer City Project, people identified where they wanted crossings and these sites often differed from those chosen by highway engineers.

- When attitude studies in Wolverhampton showed that fears about assault in subways stopped residents in outer estates from visiting the town centre, the most dangerous sites were redesigned as at–level crossings.

- In Ipswich town centre, deterrents to walking were found to include dog dirt, lack of toilets and begging, nothing to do with road safety.

- A five-town study of routes shared by pedestrians and cyclists found that, although many people tolerated the mixing on altruistic grounds, some with disabilities (especially those with hearing and visual impairments) felt unable to use them.

Source: Social Research Associates (1999, unpublished). Cited in IHT 2000.

Photograph: Lynda Addison

Photograph: Lynda Addison

Graffiti and unpleasant environments for walking

Figure 9: Pedestrian casualty rate per distance walked, Great Britain (Reported Road Casualties Great Britain, DfT annual)
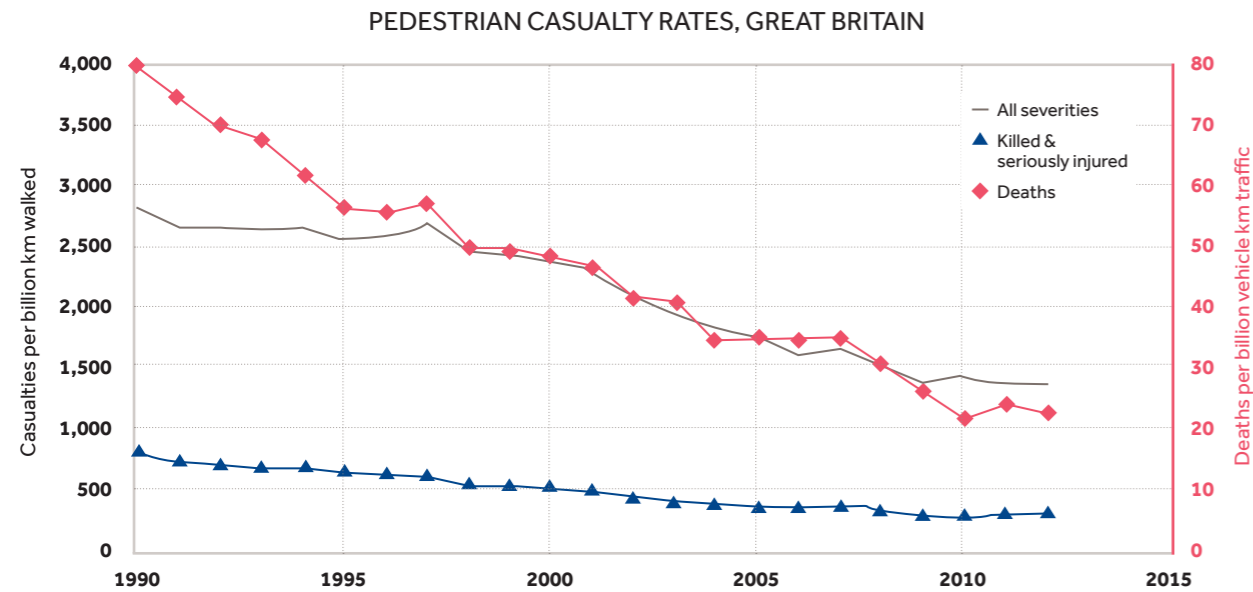
PEDESTRIAN CASUALTY RATES, GREAT BRITAIN

Legend:
- — All severities
- ▲ Killed & seriously injured
- ◆ Deaths

Figure 10a: Pedestrian death rate per head of population by age, Great Britain (Reported Road Casualties Great Britain, DfT annual)

PEDESTRIAN FATALITY RATE BY AGE GROUP

Age group:
- ■ 12–15
- ○ 16–19
- ● 20–29
- ◇ 30–39
- ◆ 40–49
- ◇ 50–59
- ◆ 60–69
- ☐ 70–79
- ☐ 80+
- ▲ 70+
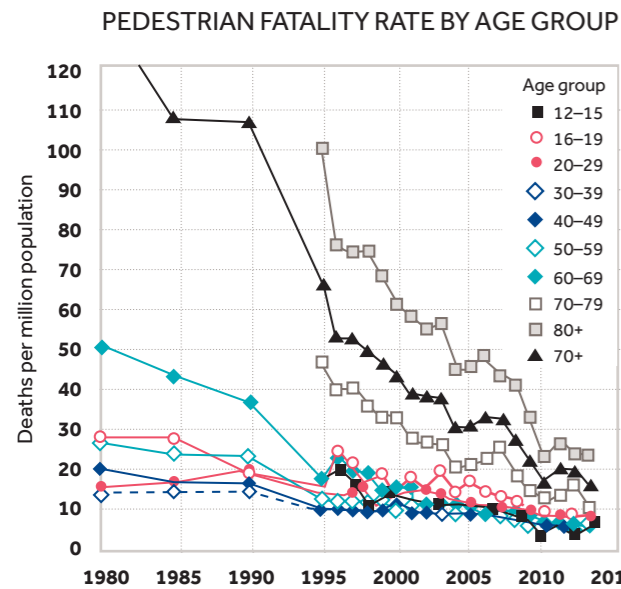
Figure 10b: Pedestrian all severity casualty rate per head of population by age, Great Britain (Reported Road Casualties Great Britain, DfT annual)

PEDESTRIANS ALL SEVERITY CASUALTY RATES

Age group:
- ○ 16–19
- ● 20–29
- ◇ 30–39
- ◆ 40–49
- ◇ 50–59
- ◆ 60–69
- ☐ 70–79
- ☐ 80+
- ▲ 70+
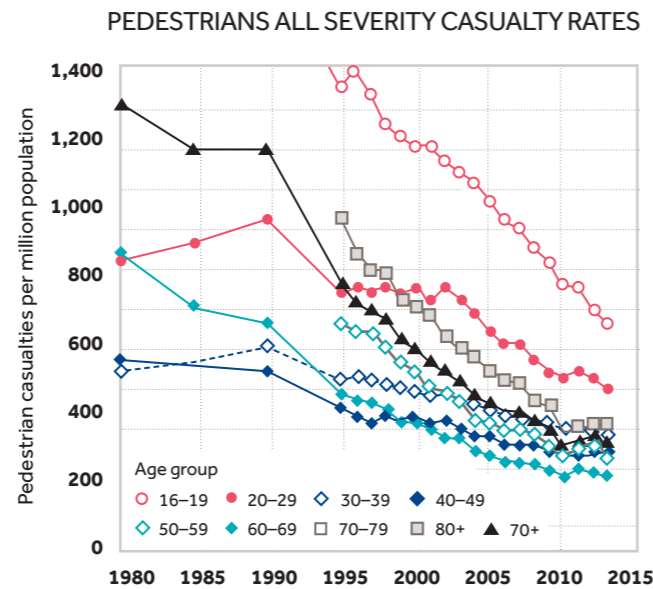
Table 4: Vehicles involved in injuries to pedestrians, 2013

Vehicle involved	Collision severity			
	Fatal	Serious	Slight	All severities
Pedal cycle	6	106	322	434
Motorcycle or moped	14	175	600	789
Car	197	3,434	12,864	16,495
Other vehicle	113	884	3,111	4,109
Accidents involving pedestrian and more than one vehicle	67	355	982	1,404

(Reported Road Casualties Great Britain, 2013, Table 10012, DfT annual)

Figure 11: Pedestrian casualties by gender and severity (Reported Road Casualties Great Britain, DfT annual)

PEDESTRIAN CASUALTIES BY GENDER

Legend:
- ▲ Male all severity
- ▲ Male KSI
- ▲ Male deaths
- ○ Female all severity
- ○ Female KSI
- ○ Female deaths
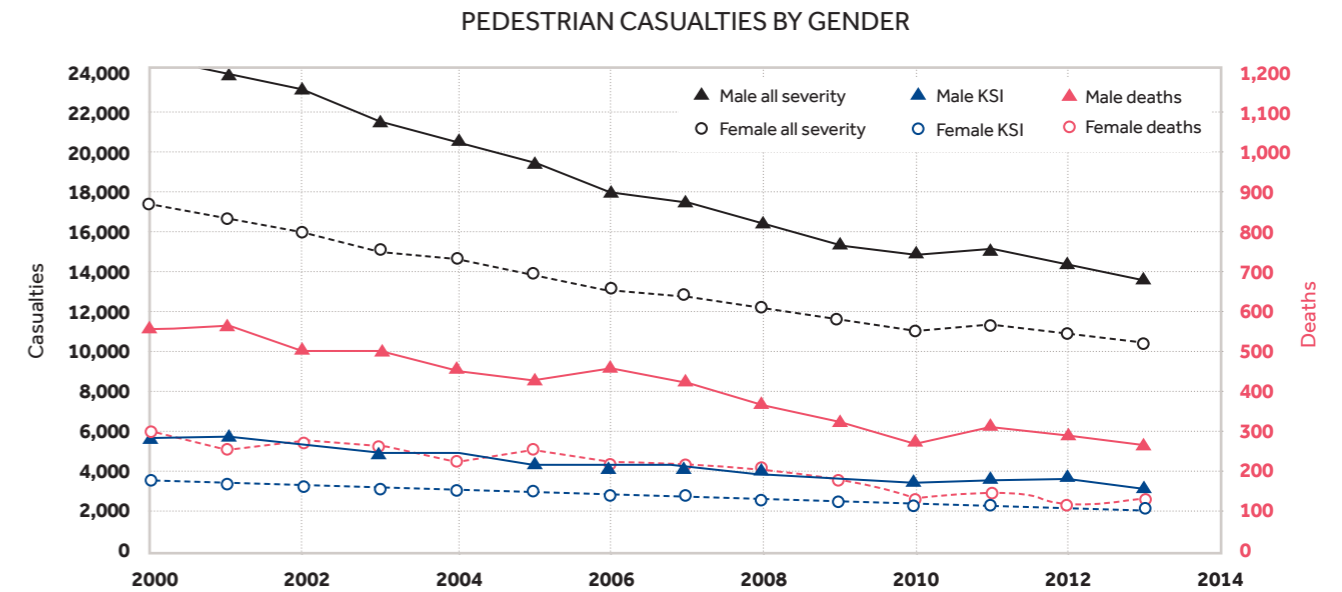
The risk to pedestrians from trips and falls, which are not recorded as transport accidents, has been discussed above.

Risk factors for pedestrians

An OECD study "Ageing and Transport" (OECD, 2001) provides the following list of risk factors for pedestrians. It relates specifically to older people but is, in practice, relevant to all:

- **Crossing busy two-way streets;**
- **Crossing major roads, particularly ones with fast traffic;**
- **Junctions with heavy traffic, particularly where there is no centre refuge**
- **Complex situations, where vehicles can come from several directions**

Activities of other road users that endanger older pedestrians include:

- **Exceeding speed limits;**
- **Infringing red lights;**
- **Parking on and blocking footways;**
- **Reversing;**
- **Turning at junctions**

Importance of traffic speed

Many studies have shown that reducing vehicle speeds reduces danger for pedestrians. Road traffic collisions and casualties in the North West of England (Deacon et al, 2011) estimates that reducing speed limits on residential roads to 20 mph would reduce the number of children killed or seriously injured by 140 per year, or 26%. The authors expect a similar 26% reduction

Photograph: Living Streets

Complicated crossing, busy roads

Figure 12: The number of pedestrian casualties nationally in urban areas and the percentage of cars exceeding the speed limit on 30 mph roads for 1998 to 2013 (Mitchell, Speed and Safety - Evidence from published data, 2012, updated)

in pedestrian casualties of all ages. Many studies have found even greater casualty reductions in town centre streets following traffic calming or other forms of pedestrian priority.

Mitchell (2012), looking at data from urban areas between 1998 and 2013, found a strong correlation between many national accident rates and the percentages of cars exceeding speed limits. For example, Figure 12 shows, for Great Britain as a whole, the number o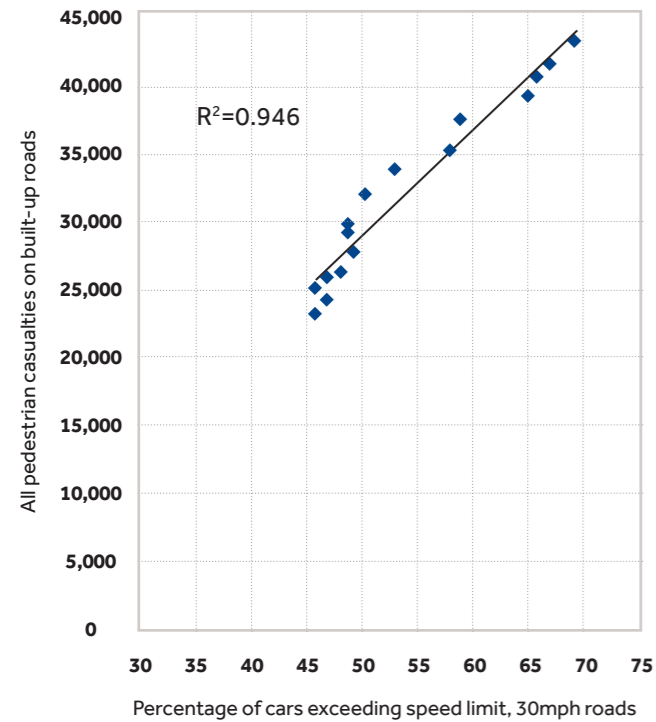f pedestrian casualties in urban areas and the percentage of cars exceeding the 30mph speed limit. The correlation coefficient for this relationship is 0.946.

More recent reports "Breaking Down the Barriers" (Living Streets, 2011b) and "Putting Pupils First" (Living Streets, 2014) discuss the obstacles confronted by children who are walking to school. "Breaking Down the Barriers" highlights perceived road safety and particularly speeding vehicles and a lack of safe places to cross roads as the main deterrents. "Putting Pupils First" emphasises concerns including inconsiderate parking and congestion, which leads to danger around the school gate.

As long ago as 1973, Hillman et al showed that children, for whom pre-motor-age streets were

both playgrounds and worlds to be explored, were increasingly being kept at home. Parents were too afraid to let them roam. This work was later taken further (Hillman et al, 1990) and found a decline in the percentage of children allowed to cross roads on their own. Alongside traffic concerns, parents also seem to be increasingly worried about 'stranger danger' when younger children walk on their own.

4.3 Street crime

Walking Good Practice (TfL 2012, section 3.2; soon to be updated) states that many people have concerns about their safety whilst on foot, especially at night and in winter. While such feelings can be due to perception of risk, rather than the actual probability of being a victim of crime, they nonetheless stop some people from choosing to walk. Concern about safety varies with social class and is strongly related to age and sex.

Dealing with such dangers not only changes how walking is perceived but can help to encourage people to walk more. This in turn increases natural surveillance and forms a positive circle as the more people are walking, the safer everyone feels, and more people choose to walk more often.

Actions that increase safety and security include improvements to:

• **unlit routes**
• **places of concealment**
• **alleyways**
• **blind corners**
• **routes under bridges**
• **subways and footbridges**
• **inactive frontages**

Before action is taken, walking audits should, where possible, be used to identify what worries residents. Once a programme of works has been chosen, inviting schools and community colleges to, for instance, decorate walls and create works of art can take renovation further by encouraging pride of place.

Safety measures can also reduce opportunities for anti-social behaviour. 'Corridor programmes' that involve replacing subways or footbridges with surface level crossings, plus the renovation of facades, removal of clutter and installation of better signs, can, for instance, create pride of place. This, with the collaboration of Community Support or Police officers, can be upheld and maintained – thereby reducing antisocial behaviour.

'Making the case for investment in the walking environment' (Living Streets, 2011a) states that:

"perceived safety, fear and mistrust have all been linked to the levels of maintenance or incivilities, for example vandalism or graffiti, in a neighbourhood (Bellair, 1997; Ross and Jang, 2000; Foster et al, 2010). Residents who feel that maintenance and vandalism are a problem have been found to be more than twice as likely to be fearful of crime (Foster et al, 2010). As well as maintenance levels, perceived safety has also been linked to the liveliness of streets; the presence of other people reduces fearfulness (Tiesdell and Oc, 1998) and informal social interactions can buffer fear and mistrust in neighbourhoods (Bellair, 1997; Ross and Jang, 2000)."

4.4 Barriers to movement, including main roads, railways and canals

Many elements of towns and cities, such as rivers, major roads, railways and canals, are difficult or impossible for pedestrians to cross and sever adjacent districts. Where such barriers have existed for generations, adjoining districts often turn their backs on them. If a major attractor of walking trips, such as a college, supermarket or clinic, lies or is built close to a barrier, the case for overcoming it is strengthened.

Photograph: Mark Philpotts

The A127 severs this suburban area

5. Legal and Regulatory Context for Walking

5.1 Definitions
The following definitions may be useful:

Highway: A highway is a way over which the public have the right to pass and repass.

Carriageway: A carriageway is a highway or part of a highway over which the public have right-of-way for vehicles.

Footway: A footway is that part of a highway which also comprises a carriageway, over which the public have right-of-way on foot only.

Footpath: A footpath is a highway over which the public have right-of-way on foot only, not being a footway (i.e., not adjacent to a carriageway).

Bridleway: A bridleway is a highway over which the public have right-of-way on foot and on horseback.

Cycle Track: A cycle track is way that is part of a highway over which the public have right-of-way on pedal cycles, other than pedal cycles that are motor vehicles, with or without the right-of-way on foot.

Road: A road in England and Wales is any length of highway or any other road to which the public have access and include bridges over which a road passes.

A footway, part of a highway that includes a carriageway

The following sections quote legislation that affects pedestrians to help those who need to see the detailed wording rather than general statements of intent. The extracts are believed to be accurate at the time of going to press, but it is the responsibility of the user to check for current wording. All the legislation quoted is available on the web; for example, the Highways Act 1980 is at http://www.legislation.gov.uk/ukpga/1980/66/pdfs/ukpga_19800066_en.pdf.

5.2 Rights of pedestrians
While vehicles are, by law, obliged to stay in the carriageway, and can be prosecuted for travelling along the footway, people on foot have a right to use all parts of a highway—subject only to an obligation to cause neither an obstruction nor a hazard (see Section 5.1 for definitions of highway, footway, etc.). There are exceptions to this, such as motorways and tunnels, from which pedestrians are specifically excluded because of safety. Broadly speaking, pedestrians are entitled to cross roads anywhere, and drivers and cyclists are obliged to avoid them.

5.3 Highways Act 1980
The Highways Act 1980 defines the following powers and duties for highway authorities with regard to pedestrians:

Paragraph 26 gives highway authorities powers to construct footpaths and bridleways and to use compulsory powers to acquire land to do so:

Where it appears to a local authority that there is need for a footpath or bridleway over land in their area and

A footpath, not adjacent to a carriageway

they are satisfied that, having regard to –
(a) the extent to which the path or way would add to the convenience or enjoyment of a substantial section of the public, or to the convenience of persons resident in the area. 26.-(1)

Under safety provisions:

It is the duty of a highway authority to provide in or by the side of a highway maintainable at the public expense by them which consists of or comprises a made-up carriageway, a proper and sufficient footway as part of the highway in any case where they consider the provision of a footway as necessary or desirable for the safety or accommodation of pedestrians; and they may light any footway provided by them under this subsection. 66.-(1)

A highway authority may provide and maintain in a highway maintainable at the public expense by them which consists of or comprises a carriageway, such raised paving, pillars, walls, rails or fences as they think necessary for the purpose of safeguarding persons using the highway.66.-(2)

A highway authority may provide and maintain in a highway maintainable at the public expense by them which consists of a footpath, such barriers, rttails or fences as they think necessary for the purpose of safeguarding persons using the highway. 66.-(3)

A highway authority may, in relation to a highway maintainable at the public expense by them which consists of or comprises a made-up carriageway, construct and maintain works in that carriageway for providing places of refuge for the protection of pedestrians crossing the carriageway. 68.-(1)

Paragraphs 69 and 70 give highway authorities powers to construct subways and bridges to assist pedestrians.

Under Part IX, Obstruction of highways and streets, the highway authority has powers to require landowners to trim trees, hedges and shrubs:

Where a hedge, tree or shrub overhangs a highway or any other road or footpath to which the public has access so as to endanger or obstruct the passage of vehicles or pedestrians, or obstructs or interferes with the view of drivers of vehicles or the light from a public lamp, a competent authority may, by notice either to the owner of the hedge, tree or shrub or to the occupier of the land on which it is growing, require him within 14 days from the date of service of the notice so to lop or cut it as to remove the cause of the danger, obstruction or interference. 154.-(1)

5.4 Disability discrimination
Highway and planning authorities must comply with the public sector equality duty under the Equality Act 2010, which has replaced the disability equality duty under the Disability Discrimination Act 2005. This is defined in Part II Chapter 1 of the act, available at http://www.legislation.gov.uk/ukpga/2010/15/pdfs/ukpga_20100015_en.pdf.

Public sector equality duty

(1) **A public authority must, in the exercise of its functions, have due regard to the need to:**

   (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under this Act;
   (b) advance equality of opportunity between persons who share a relevant protected characteristic* and persons who do not share it;
   (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it. (*Disability.)

(2) **A person who is not a public authority but who exercises public functions must, in the exercise of those functions, have due regard to the matters mentioned in subsection (1).**

(3) **Having due regard to the need to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:**

   (a) remove or minimise disadvantages suffered by persons who share a relevant protected characteristic that are connected to that characteristic;
   (b) take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it;
   (c) encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.

(4) **The steps involved in meeting the needs of disabled persons that are different from the needs of persons who are not disabled include, in particular, steps to take account of disabled persons' disabilities.**

(5) Having due regard to the need to foster good relations between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:

(a) tackle prejudice, and
(b) promote understanding.

(6) Compliance with the duties in this section may involve treating some persons more favourably than others; but that is not to be taken as permitting conduct that would otherwise be prohibited by or under this Act.

(7) The relevant protected characteristics are:

- **age**
- **disability**
- **gender reassignment**
- **pregnancy and maternity**
- **race**
- **religion or belief**
- **gender**
- **sexual orientation**

Those who fail to observe these requirements will be at risk of a claim. Not only is there an expectation of action, but also the duty is retrospective, and local authorities will be expected to take reasonable action to rectify noncompliance in existing areas.

In practice, this means that the design of footways, footpaths and road crossings must, to the extent that is reasonably possible, provide for the requirements of people with locomotive and sensory disabilities. To date, there has been little research on how best to cater for people with cognitive disabilities, but as research indicates such measures, they will need to be considered.

5.5 Active Travel (Wales) Act 2013
The Active Travel (Wales) Act 2013 is intended to require local authorities in Wales to continuously improve facilities and routes for pedestrians and cyclists and to prepare maps identifying current and potential future routes for their use (Welsh Government 2013). It will also require new road schemes to consider the needs of pedestrians and cyclists at design stage. It has created new duties for local authorities in Wales and for the Welsh ministers, and also given the Welsh ministers the power to issue guidance on the location, nature and condition of active travel routes and facilities to ensure they are suitable for use. Design Guidance Active Travel (Wales) Act 2013 (Welsh Government 2014) describes the principal legislation as:

The Active Travel Act makes provision

(a) for approved maps of existing active travel routes and related facilities in a local authority's area,
(b) for approved integrated network maps of the new and improved active travel routes and related facilities needed to create integrated networks of active travel routes and related facilities in a local authority's area,
(c) requiring local authorities to have regard to integrated network maps in preparing transport policies and to ensure that there are new and improved active travel routes and related facilities,
(d) requiring the Welsh ministers to report on active travel in Wales,
(e) requiring the Welsh ministers and local authorities, in the performance of certain functions under the Highways Act 1980, to take reasonable steps to enhance the provision made for walkers and cyclists and to have regard to the needs of walkers and cyclists in the exercise of certain other functions, and
(f) requiring the Welsh ministers and local authorities to exercise their functions under the act so as to promote active travel and secure new and improved active travel routes and related facilities.

For further detail, see the Active Travel Act and Welsh Government (2014), in which Table 2.1 lists the powers the act adds to the Highways Act 1980.

6. Developing Strategy and Plans for Walking

As awareness of the benefits of walking increases, so does the desire to improve "walkability." Academics have studied walkability without coming up with any generally accepted measure of what improves it, but factors considered important include the closeness and directness of routes to local services, the quality of footways and street crossings, perceived personal security and the good appearance of routes. One study in Galway (Leyden, 2003) shows that in the older parts of Galway City, with higher densities and mixed land use, as compared with the recent suburbs, people felt more part of the community, knew their neighbours and could walk to work.

The Active Travel (Wales) Act 2013 requires local authorities to map both existing and new and improved walking and cycling ways (called "active travel routes") and related facilities. Local authorities are required to have regard for such maps when preparing transport policies.

In Britain, generally, it is considered to be good practice to include in local and neighbourhood plans both existing pedestrian networks and those to be developed over the lives of plans. The aim is to ensure that over, say, 10 years, all places, activities and services are linked by pedestrian networks. Equally important are:

- **to gear Section 106 policies, infrastructure delivery programmes and Community Infrastructure Levy (DCLG, 2014) to the same aim and**
- **to ensure that development management officers consider pedestrian networks and land uses prior to granting planning permissions.**

Funding
Section 106 agreements with developers related to planning obligations can be used not only to pay for housing, education and other needs but also to improve walking conditions in the vicinity of developments. It is likely to be helpful that such works, through improving the settings of buildings, could add commercial value.

Community Infrastructure Levy is a new tariff-based planning charge that came into force in 2010 (DCLG, 2014). It allows local authorities in England and Wales to raise funds from developers undertaking new building projects in their area. The money can be used to fund a wide range of infrastructure that is needed as a result of development. This includes road schemes, flood defences, schools, hospitals, park improvements, green spaces and leisure centres.

Charging authorities wishing to charge the levy must produce a charging schedule, setting out the levy's rates in their area. This will form part of the documents making up the local authority's local development framework in England, which sits alongside the local development plan in Wales and the London plan in the case of the mayor's levy. In each case, charging schedules will not be part of the statutory development plan.

The levy is intended to provide infrastructure to support the development of an area rather than to make individual planning applications acceptable in planning terms. To ensure that planning obligations and the levy can operate in a complementary way, the regulations scale back the way planning obligations operate. Limitations are placed on the use of planning obligations in three respects:

i. putting the government's policy tests on the use of planning obligations set out in Circular 5/05 Planning obligations on a statutory basis for developments that are capable of being charged the levy

ii. ensuring the local use of the levy and planning obligations does not overlap
iii. limiting pooled contributions from planning obligations towards infrastructure that may be funded by the levy.

Local authorities should include a walking network/strategy in their local plan that is spatially explicit so that both Section 106 Planning Agreements and Community Infrastructure Levy charges can be related to its delivery. The development of a walking strategy and the pedestrian network to support it are outlined below (DfT, 2000; DETR, 2000).

6.1 Delivering walking schemes
In October 2014, the Department for Transport published for consultation its draft Cycling Delivery Plan, which also included planning for walking (DfT, 2014b). This states the government's vision that walking and cycling become the natural choices for shorter journeys – or as part of a longer journey – regardless of age, gender, fitness level or income.

The government has clarified its commitment to supporting cycling and walking over the long term through the duty in the Infrastructure Act 2015, which requires it to put in place a cycling and walking investment strategy. This strategy must set out the financial resources that the government will make available towards meeting its cycling and walking objectives.

Leadership and vision are vital at a local, as well as national, level. The draft Cycling Delivery Plan outlines the government's intention to set up partnerships with local authorities, where – in exchange for signing up to a series of actions to deliver ambitious changes in cycling and walking – local authorities will receive access to supporting tools and incentives, including knowledge sharing, priority access to funding and sector expertise.

At the time of going to press, the department had not yet published a response to the Cycling Delivery Plan consultation.

The DfT Traffic Advisory Leaflet 2/00 "Framework for a local walking strategy" aimed to help local authorities prepare strategies for walking (DfT, 2000). It complemented the DETR publication Encouraging walking: Advice to local authorities (DETR, 2000) and described the minimum actions necessary to achieve real change. In due course these documents will be superseded by a new publication from the DfT, but at the time of going to press they still offer useful advice.

The "5Cs" of Good Walking Networks

1. *Connected:* Walking routes should connect all areas with key "attractors" such as public transport stops, schools, work and leisure destinations. Routes should connect locally and at district level, forming a comprehensive network.

2. *Convivial:* Walking routes and public spaces should be pleasant to use and allow walkers and other road users to interact. They should be safe, inviting and enlivened by diverse activities. Ground floors of buildings should be continuously interesting.

3. *Conspicuous:* Routes should be clear and legible, if necessary, with the help of signposting and waymarking. Street names and property numbers should be comprehensively provided.

4. *Comfortable:* Comfortable walking requires high-quality pavements, attractive landscapes and buildings and as much freedom as possible from the noise, fumes and harassment of vehicles. Opportunities for rest and shelter should be provided.

5. *Convenient:* Routes should be direct and designed for the convenience of those on foot, not those in vehicles. This should apply to all users, including those whose mobility is impaired. Road crossings should be provided as of right and on desire lines.

Transport for London: "Improving Walkability: Good practice guidance on improving pedestrian conditions as part of development opportunities," September 2005. (Edited)

TfL defines the "5Cs" of good walking networks in Improving walkability (TfL 2005). These are shown in the box above.

Plans for walking will often refer to a user hierarchy. This provides that in the planning, designing and maintenance of most urban roads, the greatest priority is given to meeting the needs of pedestrians.

Numerous DfT documents define "road user hierarchies," in which pedestrians and pedal cyclists are given the highest priority and private car users the lowest. *Manual for Streets* (DfT, 2007) defines a "hierarchy of consideration," whereby designers should think about pedestrians' needs first. It also recommends that increased consideration should be given to the "place" function of streets. This approach to addressing the classification of streets needs to be considered across built-up areas, including rural towns and villages, so that a better balance between different functions and street users is achieved.

The booklet *Street Design for All* (Davis, 2014) contains advice on how to make streets high-quality places, while permitting the necessary movement of vehicles. It contains many examples of good practice and emphasises the vital importance of quality design of all aspects of a street.

The CIHT guidelines *Providing for journeys on foot* contains a section on the appraisal of pedestrian schemes (IHT, 2000a). This states:

Providing for walking is now a priority of transport policy. An increasing proportion of local transport funds is likely to be directed towards pedestrian-friendly schemes. This brings with it a greater need to ensure that the schemes (physical schemes and policy measures) are effective and properly prioritised.

Local walking plans may also need to include appraisal policies. Such assessments, undertaken prior to scheme implementation, are intended to ensure that pedestrians' needs are met. The main reasons for carrying out appraisal are:

- to demonstrate that schemes have been selected rationally and in accordance with objectives
- to compare and prioritise different approaches to design
- to compare and prioritise competing pedestrian schemes
- to compare pedestrian schemes with improvements to other forms of transport
- to demonstrate that schemes represent value for money
- to comply with the requirements of the funding regime, in particular the local transport plan guidance

Assessment criteria are often a combination of:

- severity of the problem
- degree of benefit predicted
- ease of implementation
- policy priority
- cost

Details of assessment schemes, and methods for assessing the effectiveness of a scheme after implementation, are given in *Designing for walking* (CIHT, 2015).

An example of a comprehensive set of walking policies is provided by those developed by Plymouth City Council, as shown in the box below.

6.2 Pedestrian networks

A town's pedestrian network consists of its footways (pavements) provided, wherever possible, on both sides of carriageways, plus footpaths which do not follow highways. These routes should connect all parts of a town, including its centre, to one another and link with footpaths running into the countryside to adjacent settlements. Paths along river banks, canal towpaths, paths across open spaces, bridges of all kinds and diverse shortcuts complete such networks.

The Department of the Environment Northern Ireland guidelines Creating Places (DOENI, 2000) lists priorities for pedestrian routes in residential developments:

Main objectives
To help reduce the use of cars and encourage walking and cycling and provide links to public transport, the routes provided for pedestrians and cyclists should be laid out and designed to:

- *be as direct as practicable in relation to local facilities, bus stops and railway halts*
- *provide attractive routes and accommodate conveniently and safely the numbers of pedestrians and cyclists likely to use the routes*
- *help minimise the hazards associated with vehicular traffic*
- *help enhance the appearance of developments by providing space for planting*
- *have the easiest practicable gradients (taking into account the special needs of people whose mobility is impaired)*

Design Guidance Active Travel (Wales) Act 2013 (Welsh Government 2014) sets out a process for planning a pedestrian network, summarised in the box overleaf.

Plymouth City Council – Walking Policies

Achieving our aims
New planning policy will encourage higher population densities and the siting of new facilities within existing urban areas. In order to ensure that people walk more, pedestrian policies need to be improved too. Plymouth City Council will take action to increase the proportion of journeys made on foot.

Road user hierarchy
In order to promote sustainable transport, the following road user hierarchy will govern the design of all developments and be used to review existing provision:

- **pedestrians and people with disabilities**
- **cyclists**
- **public transport users**
- **commercial and business vehicles and private motorists**

Road space reallocation
The extent of footways will be reviewed in the light of the potential demand for walking and the needs of people with mobility and visual impairments.

The review will assess where a footway is required but does not exist and where the current width is inadequate. Road space will be reallocated to pedestrians at the expense of motorised traffic where a fairer distribution attainable.

Pedestrian priority
Home Zones (residential streets in which the road space is shared between motor vehicles and other road users with the needs of pedestrians, including children, and cyclists coming first) will be introduced into Plymouth. In such areas maximum vehicle speeds will be restricted to 5 to 8 mph. Narrowed and built-up junctions and cul-de-sacs create barriers to traffic and indicate to drivers that they are entering a pedestrian priority zone. By building up the level of the road and getting rid of divisive kerbs, streets are made available to all types of users. When equipped with seats, shelters and good lighting, they provide a safe and secure pedestrian environment. The resulting improvements in quality of life for residents include reductions in car and street crime and road safety benefits.

http://www.plymouth.gov.uk/psacheivingouraims

Footpath linking culs-de-sac

Culs-de-sac need special attention, as the deterrent to walking they and gated communities pose should be recognised and, if possible, eliminated. Wherever possible, culs-de-sac should be linked by footpaths (ways for walkers not alongside roads) to provide through routes for walkers and cyclists despite being dead ends for motor vehicles. They should provide direct pedestrian paths to bus stops and neighbourhood centres. These through routes will not be used unless people are aware of them, so they should be made clearly visible and signed.

Pedestrian routes should be plotted on local maps to check permeability. Figure 14 shows an example from Manual for Streets (DfT, 2007).

An analysis of movement within an existing settlement will help identify any changes required for it to mesh with a new development. It could also influence movement patterns required within the new development. For new developments, an understanding of how an existing area functions in terms of movement and place enables the proposed points of connection and linkage to be identified, both within and from the site, so that important desire lines are achieved. This process will help ensure that a new development enhances the existing movement framework of an area rather than disrupting or severing it. Mapping footpaths as well as streets displays the full range of routes and ensures that parts of an area are not isolated.

The importance of following desire lines
Networks of routes for pedestrians should be based on the understanding that pedestrians prefer the shortest, most direct paths between their origins and their destinations. Road crossings should be safe both objectively and as perceived by pedestrians. They should not require pedestrians to divert from direct routes or cause excessive delays. Footways and footpaths should link main trip generators as directly as possible. Pedestrians prefer to see places to which they are heading, and although gentle curves will generally be followed, sharp changes in direction will not. Walkers can only be deflected from shortcuts if these are blocked, which is undesirable and often requires guardrail or other street clutter.

Most walking trips begin at home, but most town-centre trips begin and end at public buildings or transport interchanges. Locating building entrances well is important for the convenience of pedestrians and public transport passengers. Front doors should be close to and face streets, bus stops and other walking routes. Car parks should generally be placed behind buildings and no nearer the front door than the local walking route or public transport stop ("Planning for Public Transport in Developments" IHT, 2000b).

Changes in level should be avoided where possible, but when one is inevitable, the needs of those with disabilities must be considered. Bridges, high-level walkways and subways should be avoided, unless they relate naturally to the main entrances of nearby buildings. Subways and footbridges are usually unpopular as they generally require people to deviate from their desire line and can feel threatening and unsafe. There is a move in recent years to remove them and replace them with at-grade crossings.

6.3 Land use planning for pedestrians
Most people will only walk if their destination is less than a mile away. Land use patterns most conducive to walking are thus mixed in use and resemble patchworks of "walkable neighbourhoods," with a typical catchment of around 800 m or 10 minutes' walk (see 6.4 below).

The DETR publication Encouraging walking (DETR, 2000) says:

Land use planning is the most important long term solution to both our strategic and practical transport needs. Integrated planning reduces the need for travel and makes jobs and services more easily accessible to all. We cannot emphasise enough the importance of this aim for planners. We need to change the way we plan and put greater emphasis on enabling access by walking, as well as cycling and public transport.

Achieving this change will necessitate following all the points about attractive routes already made in these guidelines. When these routes are mapped, it will become clear whether they are comprehensive and penetrate to all parts of the settlement.

Network Planning

The role of pedestrian network planning for utility trips in built-up areas is generally not to provide new walking routes per se, but to improve the existing network in order to encourage people to make more short trips on foot.

The question of where to focus investment is critical, and so this guidance outlines processes for identifying which parts of the pedestrian network should be prioritised for improvement, based around three possible approaches.

A) Walking trip attractors;
B) Funnel routes associated with land-form barriers; and
C) Footway maintenance classification.

A process map for the recommended methodology, including the three approaches, is shown in Figure 5.1.

Design Guidance Active Travel (Wales) Act 2013 (Welsh Government 2014) section 5.1

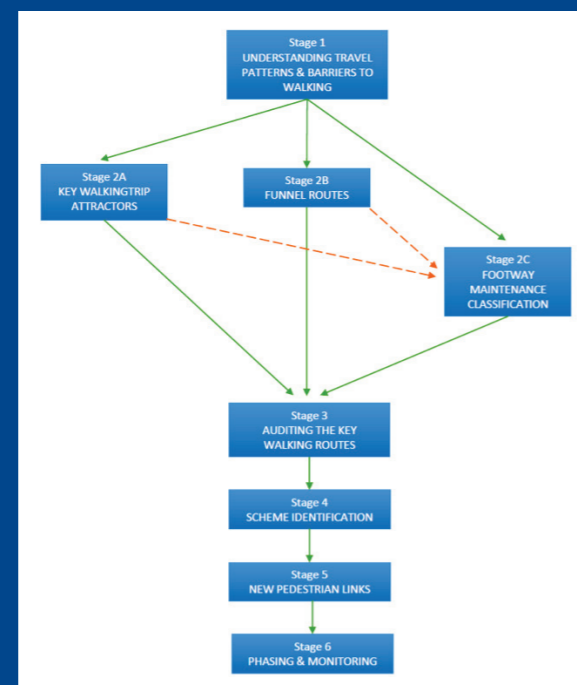**Figure 5:1: Recommended Process for Network Planning for Walking**

Figure 13: Proposed movement for the redevelopment of RAF Halton (from Manual for Streets, DfT, 2007)

Photograph: Derek Palmer

Front entrances should face streets and bus stops

Planners need, above all, to see them from the viewpoint of pedestrians, understanding their requirements and limitations.

Additions to towns, be they renewal areas or new suburbs, will be isolated if adjoining roads, footways and bus routes are not extended into and across them. Traffic on these roads should not deter pedestrians. Major roads can be designed as boulevards fronted by shops and parking. Minor roads should be subjected, as appropriate, to traffic calming or 20-mph limits.

The roads for new suburbs must be complemented by networks of pedestrian routes, consisting of footways (pavements running alongside roads), footpaths (which do not follow roads) and crossings. Maps of such networks should made at an early stage of design to reveal the presence or absence of walkability. They should show bus stops, local shops and health centres to ensure that the network provides direct routes between them and as many houses as possible. Where there are breaks in the network due, for example, to culs-de-sac, additional footpath links should be inserted.

The National Planning Policy Framework states (Para. 35. Page 10) (DCLG, 2012)

Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people. Therefore, developments should be located and designed where practical to:

- *accommodate the efficient delivery of goods and supplies;*
- *give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;*
- *create safe and secure layouts which minimise*

conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones.

6.4 Pedestrian catchments
Building Sustainable Transport into New Developments (DfT, 2008) gives the following advice on pedestrian catchment areas:

Traditional compact town layouts
Walking neighbourhoods are typically characterised as having a range of facilities within 10 minutes' walking distance (around 800 metres). However, the propensity to walk or cycle is not only influenced by distance but also the quality of the experience; people may be willing to walk or cycle further where their surroundings are more attractive, safe and stimulating. Developers should consider the safety of the routes (adequacy of surveillance, sight lines and appropriate lighting) as well as landscaping factors (indigenous planting, habitat creation) in their design.

The power of a destination determines how far people will walk to get to it. For bus stops in residential areas, 400 metres has traditionally been regarded as a cut-off point and in town centres, 200 metres (DOENI, 2000). People will walk up to 800 metres to get to a railway station, which reflects the greater perceived quality or importance of rail services.

6.5 Improving pedestrian safety
An OECD (2001) report on road safety recommends that whenever infrastructure is created or improved, highway authorities should "endeavour above all to create a safe environment for pedestrians," and that "this concern [should] underlie any land-use planning." This is the "putting pedestrians first rule," and it reflects a recognition that if, in highway works, people on foot are not considered first, they will end up being put last.

A more recent report (Mathieson et al., 2013) on the mobility and safety of older road users has, as one of the principal recommendations, the following:

Pedestrians – strong stakeholder views have been expressed about the inappropriate and inconsiderate use of footways and pedestrian areas by cyclists, parked vehicles and mobility scooters. There is a need for enforcement and encouragement for other users to consider the needs of older pedestrians who are fearful of being involved in an accident. Footways of appropriate width and adequately maintained for the older user must be considered in design and maintenance regimes.

In general, the fundamental requirements are to separate pedestrians from vehicle traffic and to limit vehicle speed. Separation can be in space, by providing separate areas for pedestrians and vehicles, or in time, by the use of traffic signals. The exception is that pedestrians and vehicles can share space in areas where traffic speeds are very low—see the paragraphs below on shared space in Section 6.7.

Infrastructure to improve pedestrian safety includes:

- **Adequate footway and footpath widths**
- **Kerb line build-outs to minimise the time taken to cross carriageways and slow traffic**
- **Preventing parked vehicles blocking footways through better enforcement or physical means**
- **Good pedestrian access to public transport**
- **More crossings which provide effective pedestrian priority**
- **Fully protected pedestrian phases at traffic signals**
- **Median pedestrian refuges**
- **20-mph speed limits**

Photograph: Living Streets

Pavement parking
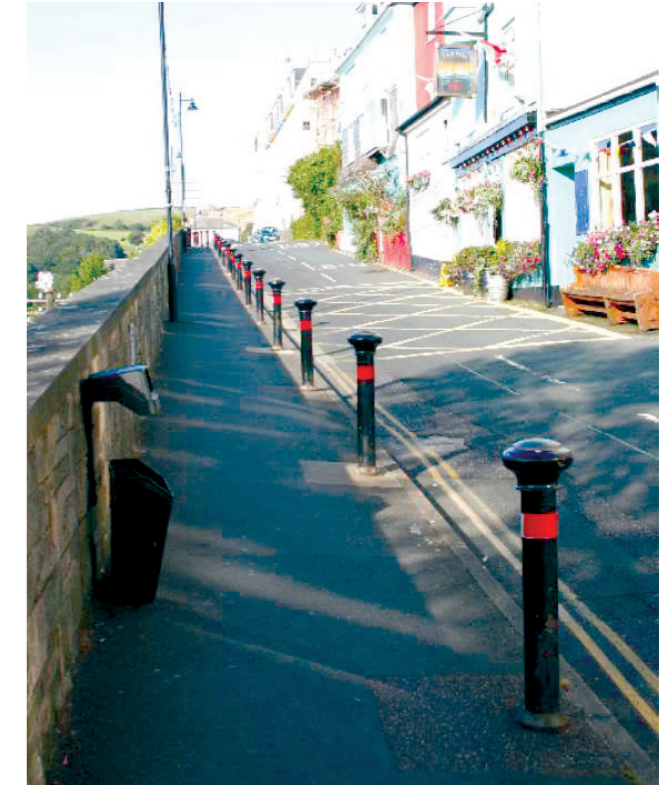
Bollards to prevent pavement parking

6.6 Giving pedestrians priority
Since Britain's first pedestrian town centre streets in Southend, Salisbury and Norwich in the 1960s, the provision of traffic-free or pedestrian priority areas in town centres has become widespread. Providing priority for pedestrians comes in various forms.

Pedestrianised streets
Pedestrianised streets are characterised by the exclusion of motor vehicles. This exclusion can be full time or service vehicles may be allowed to enter early in the morning and during late afternoons or evenings. Visitors' cars may be given access to evening activities, or to hotels. The road surface can be flush as in a fully pedestrian space, or an area for vehicles can be indicated by low kerbs, a change of surface or bollards. Whatever the surface and access arrangements, it is necessary to provide access routes for emergency vehicles.

Pedestrian precincts
Traffic-free shopping streets with or without linking arcades: open air, as in Leeds, or enclosed as in Eldon Square, Newcastle upon Tyne.

Pedestrian priority streets and areas
Pedestrian priority streets are those where only a few vehicles, such as buses, cycles or cars with blue badges, are allowed to enter, usually at low speeds. An early scheme in Oxford was monitored by TRRL, and

Light controlled pedestrian crossing

Pedestrian median refuge

Carriageway narrowing at an informal crossing

Pedestrian median refuge

filming of pedestrians showed that buses travelling at up to about 10mph appeared to be acceptable, in that pedestrians used the whole street but moved away from the paths of vehicles to avoid buses (Dalby, 1976). Buses travelling at higher speeds caused pedestrians to withdraw to the sides of the street.

Pedestrian areas are sections of town centres covering several streets and squares in which access by vehicles is limited. Such areas sometimes contain covered modern shopping centres or older arcades.

Experience and research shows that pedestrian streets and areas are popular with and attract pedestrians, reduce traffic accidents and increase retail activity (Living Streets, 2013). Access for bus services and

to car parks can be difficult in large precincts. Problems also arise in providing for people whose walking range is limited, although more and more centres have Shopmobility schemes that provide wheelchairs or mobility scooters for visitors with walking difficulties. Servicing shops in streets that have been re-designed for pedestrians can be another challenge.

6.7 Developing more balanced streets

The conversion of major roads into places
Cities such as Birmingham and Nottingham were once equipped with almost uncrossable inner ring roads where pedestrians were forced into ugly, threatening and smelly subways. These roads constrained the growth of city centres and deterred access by pedestrians.

York – pedestrian priority

They have since been transformed into tree-lined boulevards punctuated by spacious surface crossings and spaces for people to gather. Vehicle carriageways have been narrowed, footways widened and vehicle speeds reduced.

Both *Manual for Streets* (DfT, 2007) and *Street Design for All* (Davis, 2014) suggest ways in which the role of streets as places can be maintained despite modern levels of motor vehicle traffic.

Shared space
The use of shared space has become more common in recent years, having been pioneered in the Netherlands by engineer Hans Monderman. The approach involves removing much of the conventional apparatus of traffic control, including traffic signs, signals and markings. The approach can also include the removal of kerbs between carriageway and footway, known as a "level surface."

Examples of this new philosophy can be seen in New Road, Brighton, Ashford in Kent, which has transformed part of its ring road, and in Coventry city centre, where traffic signals have been removed from a number of junctions. Poynton in Cheshire currently represents the most ambitious use of shared space. The village improvement scheme there involved the creation of a sequence of informal crossings highlighting pedestrian desire lines, a central reservation to assist pedestrians to cross a major road, narrow traffic lanes to keep vehicular speeds low, and repaved footways, including the repaving of the private shop forecourts to enhance the pedestrian environment.

Concerns have been expressed on behalf of blind and partially sighted people about the lack of clarity as to

which parts of the street might be used by vehicles. DfT guidance in Local Transport Note 1/11 on shared space makes it clear that the needs of all road users should be considered during the design phase and recommends the demarcation of "comfort space' areas where a level surface is part of the scheme. In Exhibition Road, London, tactile surfaces have been used to warn pedestrians with impaired vision that they are walking into a trafficked area.

6.8 Transport terminals
Railway stations and bus terminals attract large numbers of pedestrian journeys. Care should be taken that pedestrian routes to and from them are provided and are well signed. It is important that passengers arriving at stations should be able to find the way to nearby neighbourhoods and to buses to other parts of the town.

Direct pedestrian routes are part of the answer. Good information and clear signing to pedestrian routes and bus stops (with clear bus service information) are important too. Bus operators can help by clustering the stops of buses that go to the same district. Safe road crossings enable passengers to get to stops from both sides of the street. Routes should be step free to assist travellers with wheeled luggage and people using wheelchairs or baby buggies.

Fully pedestrianised

Pedestrian priority Gardner Street, Brighton

6.9 Wayfinding

Pedestrians are helped if walking routes are well signed and show the distances and/or times to useful destinations. Maps showing walking routes are also valuable, particularly in places frequented by tourists. Strangers often find it difficult to follow pedestrian routes and do not appreciate the nearness of many destinations.

Research by TfL for the Legible London scheme makes clear that not even the best street-based maps can be expected to suit the needs of all. The preferred mix of information is a wide variety of commercially available paper maps, A to Zs and "rough guides" plus carefully thought-out on-street fingerposts or other wayfinding displays (SDG/TfL, 2014).

Developments in digital wayfinding provide new opportunities to help walkers and encourage walking. All wayfinding systems should therefore be designed to work alongside digital guidance services (see Section 8).

Different settings call for different approaches to sign-writing. Small-scale, discretely coloured, "heritage" signs, fitted to the speed of wandering tourists, are widely used in the centres of historic towns—though modern designs, if equally small and discrete, could be used. The Legible London project has done a great deal to improve signing for way finding in London and has shown that clear signing does not have to be intrusive.

Railway stations, by contrast, are often disorienting in layout and full of harassed travellers and need something bigger and more strident. Examples from Central York, Legible London and a railway station in Copenhagen illustrate the different approaches (Figure 15). In street locations, signs and fingerposts need to be placed near lamp posts or other sources of light.

Figure 14: Signs for pedestrians providing differing degrees of clarity and ease of use

A Legible London finger post

Sign in a Copenhagen urban railway station

Finger post in York

7. Promoting Walking

Delivering Travel Plans through the Planning Process (DfT and DCLG, 2009) defines a travel plan as is a long-term management strategy for an occupier or site that seeks to deliver sustainable transport objectives through positive action and is articulated in a document that is regularly reviewed. Travel plans have been used successfully for many years whether secured through planning or prepared on a voluntary basis. They are an important tool for promoting sustainable travel (e.g., walking, cycling, public transport, and help to reduce single-occupancy car use, as described in the report *Smarter Choices: Changing the Way We Travel* (Cairns et al., 2004). Travel plans are now being used to secure the provision of sustainable travel choices both to new developments and extensions of existing sites.

The DfT Smarter Choices and Sustainable Travel Towns programmes have shown the effectiveness of promoting walking. In the three "sustainable" towns (Worcester, Darlington and Peterborough), where residents were given information about cycling and walking, travel on foot increased by 10% to 13% (Sloman et al., 2010).

The travel plan process may be centred on an activity centre, such as a school, a workplace, or a hospital; on individuals, through Personal Travel Plans; or on a complete area, as in the Sustainable Travel Towns. In each case, the process involves identifying barriers to the use of sustainable travel modes, followed by a programme of information and persuasion to encourage their use, plus relatively low-cost investments to reduce or remove the barriers. These investments can include improvements to pedestrian infrastructure, including safer road crossings, provision of cycle racks, bus shelters, seats, real-time information, priority parking for car sharers and, where appropriate, support for improved public transport, at least for a limited period.

Getting the correct "building blocks" in place is key to securing successful travel plans; robust clear local policies are needed, which build on national and regional policy. To achieve clarity, local authorities should publish guidance, stating the nature and scale of new development that will require travel plans, what type of travel plan is needed in different situations and the broad objectives they are seeking. These objectives are more effective when linked to the wider spatial planning objectives of achieving effective use of existing transport networks, supporting sustainable accessibility to sites and encouraging more efficient use of land. Considering the transport assessment and travel plan as an integrated package to deal with the transport impacts of a development is the most effective approach. They should be submitted together with the planning application wherever possible.

Cairns et al. (2004) concluded that under a "high-intensity" scenario provided by a much more widespread implementation of good practice, albeit to a realistic level, travel changes could be:

- **a reduction in peak period urban traffic of approximately 21% (off-peak 13%),**
- **a reduction of peak period nonurban traffic of approximately 14% (off-peak 7%) or**
- **a nationwide reduction in all traffic of approximately 11%.**

These figures represent a cautious estimate of the effects of significantly scaling up work on soft factors from its current level. The scenario described is one where soft measures have benefited from a high-intensity policy buildup over a period of approximately 10 years. The "low-intensity" scenario is defined as a projection of the 2003–2004 levels of local and national activity on soft measures. This would achieve substantially smaller changes in travel behaviour, including a reduction in peak period urban traffic of approximately 5%, and a nationwide reduction in all traffic of 2% to 3%.

Using current DfT practice for estimating the value of the effects on travel times of a reduction in the number of vehicles, each £1 spent on soft measures could produce benefits of about £10 on average and considerably more in congested conditions.

Delivering sustainable low-carbon travel (DfT, 2009) states that marketing and communications are essential to winning support for proposals and for maximising changes in behaviour. Promoting sustainable travel is about winning hearts and minds as much as about providing practical support and information. Branding should be considered early on because it helps improve public recognition of plans and give coherence to their different parts.

The pilot stage of such a campaign was carried out in Loughborough (Leicestershire CC, 2013). The result of providing "personal travel planning" to individuals in 4,000 households was a reduction in car driver trips by 10%, while 14% of participants claimed to have changed their travel behaviour. Later stages of the campaign have shown increases in walking to work of 3% to 5%.

8. Looking to the Future

8.1 Sustainability
The threat of climate change has, for at least two decades, led to demands to raise the fuel-efficiency of buildings and to make day-to-day living less dependent on cars—"sustainable development." This has, in turn, led to planning guidance to increase residential densities (see 8.2 below) and to prioritise walking, cycling and public transport. In the longer term, rising energy costs could reinforce these policies, or new power technologies could create a changed policy context.

Another reason for biasing development towards more sustainable forms is the growth in the number of older people (see 8.3 below). The requirements of such individuals are fully compatible with environmental sustainability. What could suit older people better than good alternatives to cars, walkable neighbourhoods, safe and comfortable conditions for walking and public transport for longer journeys? Smaller gardens for easy maintenance could suit many.

Although the primary effect of climate change is forecast to be greater extremes in the weather, this will, of course, involve hot spells. Given such prospects, appropriate tree planting offers the triple benefits of absorbing carbon dioxide and greening the city and creating shade for walkers.

8.2 Residential densities
Housing density is a contentious topic. Architects such as Lord Rogers have argued that higher densities increase the practicality of travel on foot, by bike and by bus; create a "vibrancy" that results from drawing people together; and lead to a desirable architectural quality called "urbanity" (Fig 15). But residential densities in towns have been reducing for at least 150 years, and the English suburban tradition goes back at least to the 18th century. In a 2003 policy statement on "residential densities," the Town and Country Planning Association, quoting "survey after survey," says (TCPA, 2003):

• **80% of people anticipating leaving their present home would prefer to move to a house with a garden;**
• **75% of single people want a garden;**
• **people living in less densely occupied areas express greater satisfaction with their area than those in areas of high residential density—they perceive more community spirit, have more friends locally and have fewer complaints about their environment; and**
• **the most common complaint about urban areas is insufficient green space.**

Even though characteristics of towns, such as housing densities, change only slowly, there are reasons to expect that, in the foreseeable future, inner-city residential densities will be driven upwards. This will be particularly the case in towns and cities where demand for accommodation is strong. Shortage of building sites, the high cost of recycling "brownfield" land and political pressure for sustainable development will also play a part in raising residential densities. This will potentially create greater opportunities for walking, provided land use is mixed, and there are useful destinations within easy distance. It will also demand vigilance by planners to ensure that higher density developments are permeable for pedestrians and that walking routes that connect new places with old are given high priority.

8.3 Planning for more elderly and elderly disabled pedestrians
In 2013, 12.0% of those living in Great Britain were aged 70 and over—a total of 7.45 million. By 2032, this total is forecast to rise to 11.62 million, 16.6%.

The frailties of elderly people, their difficulties in walking and the aids they make use of are discussed in Section 2. But not all the elderly are frail; many are energetic and keen to work, and some have to work to maintain their income. This is indicated by the 2011 census that found that, compared with the previous decennial count, those in the 65–74 age group who were still working had increased by 16% or 413,000 people.
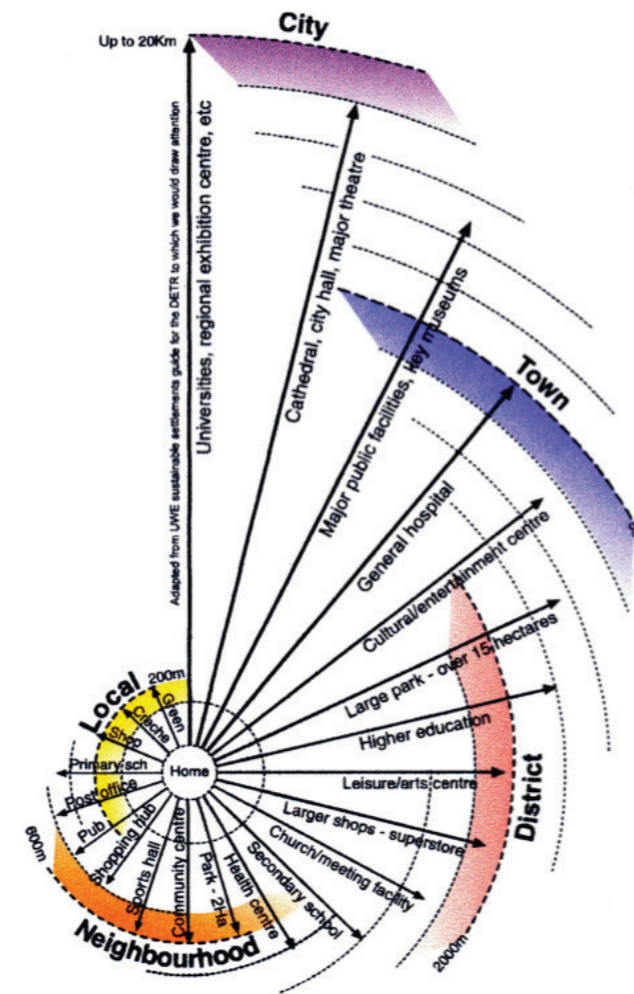

Figure 15: Provision of good social facilities Richard Rogers PartnershipThe Urban Task Force

The presence of more elderly people at work (and walking to work), increasing total numbers of elderly people and growing numbers of very old people, all need to be considered when planning for pedestrians. Compared with younger people, the elderly typically walk more slowly, find steps and stairs more difficult, are more tired by long or steep inclines, find seats and resting particularly welcome, have poorer eyesight and hearing and are more timid when crossing busy streets.

A combination of level, good-quality pavements and walking routes, protected crossings of busy streets and attractive place at which to stop and sit are thus core considerations in planning for elderly pedestrians. Median pedestrian refuges are a particular help for older people in busy roads and at junctions. Pavement scooters need to be considered too. One possibility is that they might be required to share reserved lanes with cyclists—although the acceptability of this has yet to be proved.

Planners wanting to get an insight into being an elderly pedestrian may want to experiment with going out wearing clouded spectacles and earplugs or taking trips in a hand-propelled wheelchair. These are sobering experiences.

8.4 Rising concern about health and physical exercise
Doctors, health authorities, schools and campaigning groups are all working on raising public consciousness about the unhealthy side effects of sedentary lifestyles, being overweight and neglecting to take exercise. In time, these messages seem likely to have some effect on behaviour and on increasing walking. If so, they will enhance opportunities for planners to create places that are good to be in and comfortable to walk to and from.

8.5 Section 106 Agreements and Community Infrastructure Levy: Funds for street improvements
Local authority funds for street works are expected to be in short supply for the foreseeable future. But Section 106 agreements with developers related to planning obligations and the Community Infrastructure Levy can be used to pay for new and improved infrastructure for walking. For this to be possible, local authorities need to include a strategy and a walking network in their local plan that is spatially explicit so that both Section 106 Planning Agreements and Community Infrastructure Levy charges can be related to its delivery.

8.6 Streets as spaces for multiple activities rather than just corridors for movement
City streets and squares were once places in which people walked, hawkers sold their wares, markets came and went and other civic, religious and popular events took place—together with the movement of goods and people. Residential streets were places where children played. As streets in towns and cities filled with motor vehicles, they became more crowded and dangerous and squeezed out other uses. Reaction then set in and led to the creation of pedestrian shopping streets (in Essen as early as the 1930s), pedestrian zones and a wide variety of designs of spaces shared by people and vehicles. While many further pedestrian-only spaces will no doubt be created, conditions for pedestrians need to be improved over large parts of city centres, inner cities and suburbs by developing the concept of sharing. Twenty-mph zones are only a beginning. Street Design for All (Davis, 2014) provides many examples of ways in which the quality of a street as a place can be improved by good-quality design.

8.7 Navigation on foot by smart phones and other digital aids

Digital technology, and the invention of numerous mobile phone applications, is causing a slow revolution in the lives of urban travellers. Drivers in San Francisco, having been guided, perhaps, to selected streets by their sat navs, are guided further to empty on-street parking places—thereby minimising the pollution and congestion of fruitless circling.

Meanwhile, bus companies in many cities tell passengers when the next bus will arrive by digital displays at stops, apps on smart phones or in response to a text message coded with the number of the stop.

Likewise, pedestrians can use iPhones to plug in postcode destinations and be guided to them by maps in their displays. An array of other kinds of app can be used to flag up good pubs and even, in a reverse direction, to enable merchants to attract the attention of passing walkers.

Developments in digital wayfinding technology will continue to provide new opportunities to encourage walking. Smart phones are likely to become ever more useful and widespread. All wayfinding systems should therefore be designed to work alongside digital guidance services. It should be kept in mind that the future may require a combination of sophisticated personal wayfinding by smart phone and very simple on-street finger posts. In this fast-developing digital field, it is likely that all manner of other services will

emerge over the coming decade. This could prompt people to walk more often or further.

8.8 Autonomous vehicles

Autonomous (or self-driving) road vehicles may be just around the corner, at least on some types of road. In the case of cars, manufacturers are, bit by bit, automating and interconnecting conventional vehicles—starting with motorway cruise control, which responds to the vehicle ahead to maintain a safe headway, including self-parking. Firms such as Google, having demonstrated safe self-driving cars, are now turning to developing fuel-efficient, low-polluting, self-driving cars for the sprawling suburbs. Such vehicles, travelling door to door like a taxi, could be rented from car-clubs or privately owned.

One important characteristic of the new sensory technologies is that they can detect pedestrians and, if necessary, stop. Will such vehicles usher in an urban driving and car-owning revolution? Will lines of on-street parked cars fade away as inner-city residents opt to join autonomous car clubs? Will small versions of such vehicles turn up on pavements, as is planned for Central Milton Keynes later in 2015?

A Pandora's box of possibilities is opened up by the possibility of true autonomous mobility. Might it lead to more or less walking? Might it lead to more or less attractive street environments? Might it, above all, usher in the possibility of shared space on an almost citywide scale? That is certainly a vision worth pursuing.

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