Designs for life: Learning from Best Practice Streetscape Design

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1 INTRODUCTION

Much of the recent highway design in the UK runs contrary to supporting quality in the built environment and local landscape, and there appears to be a huge gap between evolving policy thinking and implementation on the ground.

This paper reviews evolving best practice in rural areas in the UK and abroad, including innovative work in Kent, Sussex and Dorset, the Netherlands (Freisland) and synthesises common lessons for future scheme implementation in rural areas in the UK. The paper considers a number of critical issues in the evolving streetscape design debate: 1) How far travel behaviour on roads can be influenced by the expression of the environment, rather than the usual tools of traffic engineering; 2) How important psychological retreat from street use is in determining traffic speeds; 3) A new approach to design speed; 4) Potential litigation difficulties related to innovative streetscape design.

The structure for this paper is as follows:

- Emerging design principles
- Design speed approaches
- Good practice street design
- Difficult issues faced by design practitioners – risk and liability

The key message from much of the work is that streetscape design should always act to enhance the design of the local built environment and landscape.

2 BACKGROUND TO EMERGING DESIGN PRINCIPLES

The discipline of streetscape design has a rich history and has changed markedly in emphasis over the years. Alker Tripp and then Colin Buchanan (Ministry of Transport, 1963) developed much of the early influential thinking – based on a modernist vision - with separate spaces for pedestrians and motor vehicles. Much of this work was premised on understanding and accommodating the huge projected growth in traffic. A “safe” environment was perceived as requiring segregation between the car, pedestrians and other activities; meaning pedestrian decks and flyovers and precincts. The result was focused therefore on facilitating increased traffic flow. These principles became the prevailing norm in traffic engineering practice and continue, in the main, to this day. Even in rural areas, the principle of segregation has become
important, with the pedestrian, cycle and vehicle environment conceived as separate issues.

A marked change in direction was provided by the tradition of traffic calming - which has developed over the last 30 years in mainland Europe. Stemming from design practice in residential streets in the Netherlands, the traffic calming movement has been reinvigorated by the recent urban design and renaissance agendas in the UK and continental Europe, New Urbanism in the USA, and more general moves towards sustainable development. The woonerf principle for shared priority in residential areas has become particularly influential. Early practitioners in the UK, such as Carmen Hass-Klau and Tim Pharoah, “imported” many of these principles and interpreted them for the UK context. “Context sensitive design” and “shared space” practice has further evolved from these early experiments in traffic calming. The latter in particular emphasises a greater understanding of behavioural and psychological issues - considering how people and traffic interact in spaces. Hans Monderman in the Netherlands, David Engwicht in Australia, Michel Deronzier in France and Ben Hamilton-Baillie in the UK have been leading proponents of this shared space approach.¹

![Classic stereotype of a village...](from Ben Hamilton Baillie Associates)

But, too often, clutter pervades. The “traffic environment” adds little to the quality of the streetscape.

The contextual design and shared space philosophy is gaining greater credence across Europe and North America. A number of towns, cities and rural centres in the UK are beginning to re-interpret streetscape design, drawing on ‘context sensitive design’ and ‘shared space’ approaches. A number of principles appear to be emerging from work in Kent, Dorset and elsewhere:

- Travel behaviour on roads with a public character is better influenced more by the expression of the environment than by the usual tools of the traffic engineering professions (such as signing and road marking);
- Speed of traffic is, to a great extent, determined by the degree of “psychological retreat” from roads and streets by residents and other participants. Reversing this retreat is critical to reconciling the multiple roles of streets and public spaces;
• Shared space allows public spaces to develop the existing information given by the space. Traffic engineering tools are best used reticently, with the built and natural environment used to achieve the required behaviour;
• The character of the space – the context, history, morphology and landscape – becomes critical to use;
• Highway engineering evolves into a more holistic view of streetscape design. Highway engineers’ responsibility becomes the wider road users responsibility. There is a move from the use of standards towards context sensitive design, and from the safety audit to the wider design audit;
• There is a role for experimentation and monitoring of new schemes rather than an assumption concerning the effectiveness of standard measures (which are often themselves based on little evidence); and
• Streetscape design is premised on the promotion of quality of life or civility rather than traffic throughput and volume.

The collaborative European research project ‘Arterial Streets for People’ (ARTISTS) explored the classification of street function in more detail (Svensson et al, 2004). They developed a classification system to inform the design of street space based on 1) street sections having both a link status and a place status, and 2) the link and place status will depend on the immediate attributes of the street section and their role in the wider street network and urban system (see Figure 1).

![Figure 1: Classification of street function](Source: Adapted from Marshall, 2004)

This is an important step forward in recognition that wider issues such as place making are important to streetscape design.

By defining the relative importance of streets in terms of place and movement functions, subsequent design choices can be informed more effectively to avoid the marginalisation of pedestrians and cyclists and promote more...
integrated patterns of development. This approach allows design practitioners to adopt a different approach to hierarchy, whereby, historically, street designs were only based on traffic considerations. The Government’s new technical guidance on street design, the Manual for Streets (2007) examines the balance between place and movement, describes the limitations of conventional classifications and road hierarchies and incorporates the evolution of a design agenda into the streetscape design environment.

The Manual for Streets (2007) provides design criteria for delivering multi-functional streets, emphasising place over movement, focusing design guidance on predominantly urban residential streets. Demand for the Manual for Streets emerged from the Government research report Better Streets, Better Places (ODPM, 2003), which was commissioned to establish whether there were any problems over the adoption of new highways meeting the requirements of Planning Policy Guidance Note 3, Housing (PPG3). This document focused on new residential streets and asked why highway standards are undermining placemaking in the UK. The report concluded with a recommendation for development of a Manual for Streets to replace Design Bulletin 32 with an updated set of highway standards for residential roads that provides a catalyst for innovative design that emphasises place over movement.

The resulting Manual for Streets (DfT, 2007) is a guide to the design, construction, adoption and maintenance of new streets whose aim is to deliver streets that help strengthen communities, are pleasant and attractive, are cost-effective to construct and maintain, and are acceptably safe. It emphasises that movement and place considerations are important in determining the appropriate design speeds, speed limits and road geometry.

3 STREETSCAPES AND DESIGN SPEED APPROACHES

The design, management and maintenance of any highway network requires a complex balance to be made between speeds, safety, and the multitude of activities and qualities we associate with places and the public realm. It is a complex balance that can change over time as a result of changing circumstances, priorities and values. A ‘design speed’ approach (Halcrow and Ben Hamilton-Baillie Associates, 2007) attempts to redress this balance and seek ways to address mismatches between observed and desired speeds.

The relationship between speed and the quality of the environment or the optimum use of public space is inadequately quantified, but no less critical to the balance of priorities. Perceptions of risk, discomfort and severance are all closely linked to traffic speeds, together with noise, vibration and environmental pollution. There is increasing empirical observation of a critical qualitative threshold between human activity and vehicular traffic interaction at speeds of less than 19-22 mph (Hamilton-Baillie and Jones, 2005) that appears to spring from human sensory and communication abilities, and which may be particularly relevant to the use of streets and public spaces for multiple activities.
Speed is thus the critical factor in establishing appropriate measures and policy for the network of roads and streets in both urban and rural areas. Almost all design issues relating to streets are critically dependent on decisions made concerning speed. Speed issues affect dimensions and geometry, materials and paving, signing and marking, sight lines and verges, and all aspects of the relationship between roads and their environment.

Building policy around design speed

Researchers of traffic behaviour have long been aware of the strong relationship between road design and choice of speed (see TRL 322, 325 and 551). Drivers appear to take their primary cues in selecting speeds from their visual and psychological interpretation of the road environment. Legislation and the regulatory framework appear to play only a secondary role, acting as a dampener on higher speeds depending on the degree of perceived enforcement. People generally drive to the speed that they feel is appropriate for the road, based on an assessment of the context, their level of engagement, and their perception of risks.

Despite this well established connection, most debate about traffic speeds revolve around the regulatory framework, such as the introduction of speed limits and the education, enforcement and engineering to accompany them. Relatively little attention is paid to issues concerning the environmental clues that govern driver behaviour, and the potential to manipulate and exploit such clues to achieve preferred outcomes. This topic appears to be important but not well understood.

An analysis based on preferred design speed allows a systematic analysis of the context and purpose of different streetscapes. Figure 2 illustrates the broad principles behind the approach.

Figure 2: Design Speed Approach

Source: Halcrow and Ben Hamilton-Baillie, 2007
Any given stretch of road will include a number of important places, events and circumstances, such as settlements, geographical features, intersections and other factors. Each of these characteristics will influence the preferred design speed, which in turn will have an impact on the likely average journey time. Slower speeds are clearly more likely to be associated with settlements, as well as with sharp bends, intersections and other natural features or points of activity. Various different options and alternatives for differing speed assumptions might be tested, and their implications for journey times reviewed.

**Influencing design speeds**

Much traditional highway design has been developed in response to reducing or minimising hazards associated with driving at speeds. Straighter roads, wider dimensions, longer sight-lines, signs and hazard warnings sized to be read at certain speeds have assumed a simple relationship between risks and safety. However more recent analysis of risk and behaviour combined with advances in psychology and behavioural sciences suggests a more complex relationship between these two factors. Risk compensation theory (Adams, 1995) proposes that human propensity to take risks, and therefore to choose a given design speed, is not reduced by prevention from exposure to hazards. A measure such as a pedestrian barrier will, for example, change the behaviour of both pedestrian and driver. The resulting changes may serve to increase the likelihood and severity of accidents, contrary to the purpose of the intervention. The introduction of “advanced braking systems” to cars, and the resulting changes in accident patterns provides another good example of risk compensation effect.

An appreciation of risk compensation effect is central to an approach to a rural roads protocol based on preferred design speeds. It provides the key to the application of environmental factors to achieve desired speed outcomes, and underpins the research into “psychological traffic calming”. Drivers interpret the road ahead based on an assessment of risk, and respond by selecting a speed within their particular “risk thermostat”. The greater the perception of potential hazards, the slower the speeds.

A related factor in speed design relates to “intrigue” with the road environment (Engwicht, 2006). To large extent, speed is determined by the extent of potential or actual human activity in the immediate surroundings of a street or road. Speed is closely related to extent of “psychological retreat” by residents and others from the street context (Appleyard, 1981 and Hillman et al, 1990). Such a relationship implies a circular relationship – the higher the traffic speeds, the more other activities retreat from the space, thus in turn increasing speeds. The reverse cycle is also evident in an example such as a village market, where human activity reduces speeds, thus encouraging further activity. The finding that “intrigue” reduces speed has important potential for rural road design. Any feature or measure which engages, surprises, puzzles or otherwise engages the driver appears to hold the potential to influence speeds, in contrast to the standardisation and predictable qualities of conventional approaches to road design.
Exploiting road, built environment and landscape characteristics

In seeking to expand the range of elements to meet the preferred design speed, there are some inter-connected design details that are especially significant in influencing driver behaviour, namely:

**Dimensions: road widths**
Research suggests that perceived road widths are amongst the most significant factors in determining traffic speeds. They are also critical to influencing the relationship between drivers and vulnerable road users such as cyclists, pedestrians and horse riders. Narrower widths are particularly important for promoting informal crossings, and thereby increasing perceived human presence.

**Sight lines**
Reducing or limiting forward visibility is a factor in reducing speeds in certain circumstances. This builds on the recognition of the relationship between sight lines and speeds in the Manual for Streets (DfT, 2007), and may influence decisions regarding planting, landscape management, siting of buildings, boundary treatments, and street furniture.

**Verge details**
Careful attention to the handling and treatment of road edges can be an effective method of influencing design speeds and road character. Hard verges with high edge kerbs increase the linear quality of roads and increase speeds. By contrast, soft verges with grasses and other plants extending into the road enhance the relationship between driver and the surrounding context, and can exercise an important influence on speeds.

**Road markings**
The inclusion of centre lines, edge markings and other road paint can be a significant factor in determining the road character and resulting speeds. The removal or omission of centre lines has already been trialled and tested by highway authorities such as Norfolk and Wiltshire, and the relationship with speed reduction has been shown to be positive (Winnett, 2002). The use or omission of road markings can be exploited as a useful transition between higher and lower design speed areas, such as on the entrances to settlements.

**Materials and paving**
Consideration of materials, their colour, texture and qualities has an important bearing on speeds and road character. Conventional asphalt treatments offer a huge range of colours, textures and finishes that, to date, have been rarely exploited in order to achieve the appropriate design speed. Block paving, setts and paviours are generally less widely used in the UK than in mainland Europe, but can help to extend a vocabulary of surfaces to emphasise context and respond to particular circumstances.

**Signs and signals**
Road signs, and in particular their size, spacing and frequency, are important determinants of the character and speed references for both urban and rural
roads. Motorway signs, for example, are designed to be read at high speeds, and in turn signal that such speeds are appropriate. Likewise discrete lettering on rural fingerposts relates to lower passing speeds. Traffic signals at junctions and pedestrian crossings also have an important bearing on the speed characteristics of streets and roads, shifting the emphasis from social protocols to the regulatory framework. Policy for signing should flows directly from an analysis of desired design speeds.

*Gateways and transitions*

A relatively new area of research and design applies to the treatment of entry points into settlements and other transition zones. Careful analysis of the visual contextual clues is helpful in determining how road design can exploit and reinforce such transitions, to ensure that road treatment complements, rather than detracts from, natural boundaries and edges. As a general principle the use of lengthy “buffer zones” should be avoided on all but very high-speed roads in order to maximise contrasts at entry points or transitions. Landscaping, materials, dimensions, place-names, lighting, public art and many more elements can be combined to emphasize changes in scale and design speed at such points.

*Incidents and features*

The richness of the built and natural environment in the public realm provides opportunities to make maximum use of any elements within the road environment that can introduce variety, distinctiveness, promote intrigue, and generate a series of “punctuation marks” in the road network appropriate to the desired speed. Elements such as hump-back bridges, water courses, trees, railings, telephone boxes, mileposts and other elements should be carefully noted and their presence exploited to achieve the appropriate speed character for the relevant stretch of road. Similarly roads, streets and spaces within the built environment should respond to the presence of, and activities associated with, key buildings and architectural landmarks.

By placing less emphasis on standardisation, uniformity and regulation, the contextual design and shared space philosophy, encompassing a design speed approach, aims to exploit the most recent findings in traffic psychology and recognition of the potential to develop social protocols and promote civility. In doing so, it will reflect the direction of UK and European research and best practice, and will contribute to the broader development of good practice streets design.

### 4 GOOD PRACTICE STREETSCAPE DESIGNS

Good practice streetscape design, although very slow in implementation, is beginning to emerge. Rural schemes are particularly scarce. Below a number of the leading examples (some illustrative) are considered.
4.1 UK Examples

**Case Study: Cirencester and Lewes, East Sussex**
Cirencester and Lewes in East Sussex have adopted the use of paving that reflects the character of the town and the historic buildings. The narrowing of the roads, widening of pavements and the replacement of intrusive and aggressive road markings with cobbled stones naturally calms the speed at which traffic moves and contributes to a safer and friendly environment. The low rise kerbs create less segregation between pedestrian and vehicle areas and the use of cobbles and tactile paving highlights safe crossings for walkers, buggies, the disabled and elderly people.

**Case Study: Clevedon Terrace, Kingsdown, Bristol**
Improved pedestrian provision at Clevedon Terrace by use of shared space and landscaping at the junction (as proposed). The junction, formerly dominated by vehicular traffic, becomes an urban place attractive to pedestrians and cyclists (and vehicular traffic).

**Case Study: High Street Kensington, London**
High Street Kensington in London provides possibly the most well known streetscape design example in the UK. The scheme includes the removal of pedestrian barriers, minimised road markings, simplified carriageways and pedestrian crossings and the introduction of high quality street furniture.

Lessons can be drawn for practice elsewhere in terms of road space reallocation to pedestrians and cyclists, decluttering and liability issues. The scheme was implemented in 2002 and involved the removal of barriers and signage and a much
improved, high quality streetscape. The premise behind much of the work was to challenge legal assumptions concerning highway design, e.g. in the event of an accident between a pedestrian or cyclist and a vehicle. From the financial angle, the elimination of clutter can actually result in cost savings as a result of reduced infrastructure and/or maintenance costs. Following the success of the High Street Kensington scheme, Exhibition Road and Sloane Square (both in London) are to be redesigned on similar principles.

Kensington High Street has yielded significant and sustained reductions in injuries to pedestrians. It is reported that, based on two years of 'before and after' monitoring, casualties fell from 71 in the period before the street was remodelled to 40 afterwards - a drop of 43.7%.

**Case Study: Tunbridge Wells**
Tunbridge Wells has developed some excellent rural road timber kerbing, wooden backed signing and route narrowing schemes.

**Case Study: Shipbourne**
Shipbourne is a small village set around a large, attractive green in the Low Weald. The main A277 road runs north to south through the western part of the village. The Greensand Way runs east to west, adjacent to the Chaser
Inn. Current problems include speeding on the A277 and visually intrusive car parking on the green, over spilling from the Inn.

Proposal for improvement: The A227 is transformed into a shared space area in front of the Chaser Inn and potentially along the extent of the road that runs throughout the village. Kerbs and white and yellow lining are removed, and the road surface dressed and edged with a sandstone sett. A rumble strip or sandstone sett band mark the entrance to the Chaser Inn and act as a traffic calming feature. Road widths are narrowed and the quality of the streetscape specification dramatically improved.

Case Study: Chilham Gateway

The entrance to Chilham is made less traffic sign dominated and more use is made of the local context. Intrusive white lining is removed along with signage clutter. The road junction is paved with setts, possibly edged with
brick, as found outside the Woolpack Inn, to extend the visual influence of the Inn as the natural gatekeeper for the village.

Case Study: Hollingbourne
Hollingbourne provides a classic case study of gateway treatment. The approaches to the village suffer from intrusive signage, red tarmac and speed limit roundels.

The existing gateway surfacing and signage is removed. A rumble strip is provided, together with a new gateway feature to the right of the entrance, complementing the existing brick pillar opposite. Careful, context sensitive design thus slows traffic. 20 mph signs are located on the existing/new brick pillars in a more subtle manner, and white lining removed.
4.2 European Examples

**Case Study: Drachten, The Netherlands**

A Hans Monderman designed scheme in Freisland, where lines and road markings have been removed, resulted in behavioural change by all road users, motorists, cyclists and pedestrians. The resulting change in people’s perception of risk has encouraged road users to manoeuvre across junctions with more care. This is likely to be especially important in rural villages where highway traffic interacts with local traffic.

The main street through Drachten has a wide pedestrian area to either side, adjacent to the building frontage of shops. Between these there is a cyclist priority road area and the roadways and footways are demarcated by trees and lampposts. Shared surfaces are also a key feature in this public realm.

Drachten is one of the pioneer towns for such schemes. Casualty figures at one junction where traffic lights were removed, have dropped from thirty-six in the four years prior to the introduction of the scheme to two in the two years following it. Only three of the original fifteen sets of traffic lights remain. Tailbacks are now almost unheard of at the town’s main junction, which handles about 22,000 cars a day.

**Case Study: Hennef, Germany**

Frankfurter Strasse, the main road through Hennef, is part of the national road system and was a typical main road, designed to serve traffic travelling through the town while the needs of people travelling on foot or bicycle were secondary. The Frankfurter Strasse was redesigned in 1989 to create a safer and more pleasant environment for the various users of the street in which priority is given to pedestrians and cyclists.

The carriageway was reduced in width and a paved strip of granite cobbles installed along the centre of the road, providing a central refuge for pedestrians to cross the road where they wish. In some places there is one metre wide cobble strip between the carriageway and the footway. This provides a “safer first step” for pedestrians because drivers steer away from the cobbles. The granite cobble strip also encourages drivers to slow down as they find themselves closer to oncoming traffic.
All parking is in defined, metered bays at footway level; and cyclists benefit from the reduced speed of traffic and also have the choice of an advisory cycleway, at walking speed, on the footway.

5 RISK, LIABILITY AND STREETSCAPES

The Commission for Architecture and the Built Environment cite risk as a prominent feature of today's society, with the design of public space being one of the many activities affected by perceptions of risk (CABE, 2007). Arguably, risk considerations reduce the quality of public space and can affect the conduct of practitioners by stifling innovation and creative designs in the public realm.

The perception of risk associated with streetscapes and associated liability in the event of damage or injury can lead to an over-cautious approach to design, resulting in standardised streets with little sense of place or quality. In order to maintain innovation in street design while removing the risk of litigation, the Manual for Streets (DfT, 2007) recommends the use of quality auditing to ensure street designs are appropriate while accounting for the visual quality, road safety risk, accessibility for the mobility impaired, cyclists, pedestrians, and other non-motorised users.

Good public space design and management can reduce some of the undesirable risks for users, by removing clutter, but also highlighting street furniture and other obstacles in a sensitive way for mobility, sight and hearing impaired people. Nevertheless, evidence from CABE (2007) shows that people want the freedom to choose how they respond to risk, informed by sufficient and relevant information. Yet this continues to pose a major challenge for public space designers in designing for variety rather than the norm or lowest common denominator in terms of risk perception (CABE, 2007).

The highway authority has a duty to 'maintain highways maintainable at the public expense' (s41(1) of the Highways Act 1980), whereby 'maintenance' includes repair (s329 (1) of the same Act). Importantly, and in support of quality street design, case law has currently determined the following:
- The duty to maintain covers the fabric (surface) of the highway
- Inspection covers etc are part of the fabric of the highway
• Signs and lines are not part of the fabric of the highway and not covered by the s41 duty
• ‘In my judgement it is perfectly clear that the duty imposed is not capable of covering the erection of traffic signs…’ (Lavis v Kent CC 1992)
• ‘The provision of information... is quite different than from keeping the highway in repair’ (Gorringe v Calderdale MBC 2004)
• The highway authority’s statutory duty is ‘reasonably to maintain and repair the highway so that it is free of danger to all users of who use that highway in the way normally to be expected of them’ (Rider v Rider 1973)
• Authorities must provide for the ‘normal run of drivers to be found on their highways’ including those who ‘make the mistakes which experience and common sense teaches are likely to occur’ (Rider v Rider 1973)
• Motorists ‘plainly must not be trapped into danger’, although such cases are expected to be few and far between (Gorringe v Calderdale MC 2004)

In summary, it should be noted that in eliminating some risks, other risk hazards maybe created. For instance, roads with a large number of bends and blind corners along their route maybe considered a high safety risk, and yet straight wide roads often incur much higher driver speeds. So by eliminating the risks of the winding road, one is creating additional risks by inserting a straight wide road with high visibility. Therefore, the regulations and procedures associated with the road safety audits should be balanced, and avoid restraining innovative design that enhances the overall road environment and surrounding landscape.

6 CONCLUDING REMARKS

We seem to be at a defining moment for streetscape design. Practice is evolving slowly in areas such as London, Dorset, Kent and Sussex, following the continental examples seen in Freisland and elsewhere. The concept of place is becoming much more evident in many of the better streetscape designs. The challenge now is to roll out the best practice into common practice. There is a long way to go here. Many practitioners are slow to take on the new agenda, citing the lack of “evidence-base” and potential litigation difficulties as major obstacles to implementing new practice. We hope this paper and other work in this field continues to develop the issues. The concept of deign speed in particular appears to have much resonance. Exploiting the built environment and landscape through contextual design approaches, have much to offer in developing streetscapes that are considered to be attractive places to be in, and are places that last.
Notes

1. For further reading see Monderman and Hamilton-Baillie (2005) Shared Space: Room for Everyone; English Heritage (2005) Streets for All - South East/South West/London; and/or English Heritage (2004) Save Our Streets.
3. Ben Webster. "'Naked' streets are safer, say Tories: Traffic lights and signs could vanish Accidents will fall, study claims", The Times, 2007-01-22
Bibliography


Ben Webster. "'Naked' streets are safer, say Tories: Traffic lights and signs could vanish Accidents will fall, study claims", The Times, 2007-01-22


English Heritage (2005) *Streets for All*, English Heritage, Swindon


David Millward. "*Is this the end of the road for traffic lights?*, The Daily Telegraph, 2006-11-04.


Monderman and Hamilton-Baillie (2005) *Shared Space: Room for Everyone*, The Netherlands


TRL (1998) *Road layout design standards and driver behaviour*, TRL Report 322, Transport Research Laboratory, Crowthorne

TRL (1999) *The factors that influence drivers’ choice of speed*, TRL Report 325, Transport Research Laboratory, Crowthorne


TRL (2005), *Psychological traffic calming*, TRL Report 641, TRL Limited, Wokingham

Winnett (2003) *An evaluation of the effect of removing centre white lines. For Wiltshire CC*, Transport Research Laboratory, Crowthorne