

Planning networks for cycling: relevant human factors and design processes

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Abstract

Developing a network for cycle traffic is a complex process, particularly in a dense and heavily motor trafficked city such as London. The London Cycle Network Plus (LCN+) has delivered cycle routes on strategic highways and local cycling stakeholders assisted in the design process through Cycle Route Implementation and Stakeholder Plans (CRISPs). Stakeholders were trained in aspects of highway engineering and used the London Cycling Design Standards as a reference tool. The paper summarises the lessons learnt, and we conclude that knowledge from stakeholders is needed to help in the design process, and such intense involvement was novel in transport planning. The current proposals for cycle super-highways and other borough transport schemes seek to build on previous participative successes and also emphasise planning issues in the geographical neighbourhood of routes.

Keywords: traffic engineering; bicycle; stakeholder engagement

Designing for cycle traffic

The principal network available for cycle traffic is the highway network. Area wide traffic management, begun in the 1960s, has created urban areas designed specifically to maximise capacity for motor traffic. The nature of a traffic management system is to control the movement of traffic, such management may be by separation in time (e.g. controlling flow through a traffic signal controlled junction) or space (e.g. by controlling flow and conflicts by creating specific routes for traffic through signing and regulation orders).

Traffic management schemes have included the construction of relief roads, the enhancement of junction capacity, and the management of the use of highway space through traffic regulation orders such as banned turns and one-way streets. Such traffic management frequently has the effect of lengthening routes for motor traffic, however, successful schemes ought to be able to demonstrate an overall reduction in journey times. This has usually been achieved through the use of traffic assignment models incorporating detailed analysis of junctions based on analysis of traffic patterns progressing through the network. Overall, the disadvantage of longer journey distances for motor traffic is outweighed by reduced congestion, and hence delay.

Cycle users have generally been ignored in such traffic management modelling and scheme implementation. This was because, at the time when this large scale traffic management was being undertaken, there was little or no policy in place regarding the promotion of cycling as a mode of transport. Also, as bicycle flows were very low, there was little incentive to consider bicycle use properly.

UK stated transport policy has recently been to reduce transport emissions of greenhouse gases, contribute to improving people's safety, security and health, promote equality of opportunity and improve quality of life (DfT, 2008). Cycling, and indeed walking, for short travel journeys would support each of these policy aspirations. Most transport modes employ an enclosed vehicle and a lot of careful design goes into the creation of interiors which are attractive, safe and comfortable for the user. The interesting point about cycling and walking is that they are modes which

leave the user exposed to the environment through which they are travelling. While sometimes cycling or walking can be more comfortable than standing, for example, on a crowded bus, and sometimes they may be undertaken in an attractive environment, there are many times when the nature of the environment leaves a walker or a cyclist feeling far less than comfortable. There are profound implications for the way that transport networks are designed.

Parkin (2010) reviews cycling planning guidance and the characteristics of cycle users and the importance of considering the effort required to cycle. The essential requirement of design for cycle traffic is that the bicycle is regarded as a vehicle capable of speed and that, as originally suggested in Dutch guidance (CROW, 2006) networks need to provide comprehensive coverage, be as direct as possible, be attractive and safe, and be comfortable for users. These criteria, amongst other things, suggest that the traffic management regimes previously designed for motor traffic need to be revisited, and that in order to satisfy the users, who will be ‘exposed’ to the environment designed for them, users need to be consulted in scheme design.

Developing a network for cycle traffic is a complex process, particularly in a dense and heavily motor trafficked city such as London. Knowledge from stakeholders is needed to cope with this complexity and the following section overviews approaches to stakeholder engagement. The Cycle Route Implementation and Stakeholder Plan (CRISP) approach offers a process architecture that brings this knowledge into play and this is discussed in the subsequent section, together with a case study example. This approach has been applied successfully and a discussion follows about the value of the stakeholder engagement as it was promoted in London. Further developments in stakeholder engagement are then reviewed before conclusions are drawn. Overall, the aim of the paper is to demonstrate that it is necessary and possible successfully to adopt a process at the highest level of stakeholder engagement on schemes as complex as the introduction of facilities for cycle traffic in a heavily motor trafficked urban environment.

Approaches to stakeholder engagement

Transport is a complex service industry, with its product being consumed at the point of delivery. For purposeful journeys it is also, as the economists suggest, a ‘derived good’, that is to say consumers do not usually want to consume transport for its own sake, but they use it to access other activities, goods and services. This heightens the supposition amongst transport users that it should work in such a way as to not cause unnecessary issues or complications for the user. In some senses this falsely increases the expectations of the users who can be badly influenced in their view of transport’s efficacy by circumstances related to the fact that consumption of the service is occurring at the point of delivery.

Transport infrastructure, is, of course, also a significant physical asset, which needs to be constructed and maintained in the same way as any other large scale piece of infrastructure and this requires complex engineering skills. Notwithstanding, because of the impact of transport schemes on users and non-users, it has been usual for transport investment to be opened up to public scrutiny. These would normally be at the stage of making orders under, for example, the Highways Act (1980) or the Road Traffic Regulation Act (1984). Such consultation, based on a statutory requirement, inevitably leads towards a legalistic approach to the processes of consultation and may culminate in public inquiries conducted in an adversarial manner analogous to a court of law.

Recognising this, a variety of techniques for encouraging public involvement have developed (IHT, 1997). The IHT (1996) usefully defined public involvement in scheme development as being either (at the lowest level) simply an exercise in disseminating information about a scheme, or it could involve consultation, where scheme proposals are shown and explained to the public, and their responses are elicited. These responses would then be considered by the responsible authority: the power for changing a scheme design remaining with that responsible authority. A third, ‘highest’, level involves participation, where two-way dialogue can allow the public to have a direct influence on the outcome of the process. This allows for knowledge and understanding to be transferred bi-laterally between the scheme promoter and the stakeholder. It also implies that the stakeholder can have a direct impact on the outcome, and that in order for this to happen, it is likely that attitudes

and perceptions of both the scheme promoter and the stakeholder will change. The European Commission (EC, 2004) also developed a handbook for successful transport decision making based around this highest level of participation. It is this third level of consultation which has been adopted for the London Cycle Network Plus (LCN+).

We suggest that it is necessary to work at this highest level of participation for schemes as complex as the introduction of specific facilities for cycle traffic. This is because, as outlined above, the users are exposed to the environment through which they travel. Also, the complex nature of the urban environment is such that there is a lot of local knowledge in the minds of transport users which is useful to the designer. Many design features, although perhaps relatively apparently insignificant in nature, may be safety critical and users are very good at identifying potential for risk. Lower levels of engagement (information giving and consultation) may engender only awareness, understanding and perhaps support for a scheme. Participation may, though, be successful in engendering not only involvement, but also commitment to a scheme. In a negative sense, the highest level of participation may also reduce the potential for subsequent objections to any necessary legal procedures, such as the making of orders.

The nature of London Cycle Route Implementation and Stakeholder Plans

The London Cycle Network Plus (LCN+) project was defined and launched in the London Cycle Action Plan issued by the Mayor of London in 2004. Cycling formed an important part of the Mayor's Transport Strategy 2001, which called for greater continuity of the existing London Cycle Network (LCN). The LCN had been established in 1990 and was itself a revision of the Strategic Cycle Network which can have its origins traced back to 1979. The CRISP process was developed as an integral part of the LCN+ implementation process to ensure that cycling stakeholders could be involved in the design process in order to overcome some of the deficiencies which were considered inherent in the LCN.

The LCN+ provides cycle routes through London which are designed to be safer and faster for users (TfL, 2004). It has been one of Transport for London's (TfL) major

investments over recent years (TfL, 2010). There are 286 LCN+ Links in the network and these are both orbital and radial and frequently lie across borough boundaries. Improvement works have been undertaken on many of these Links. 541 'linear' assets have been delivered including cycle lanes or tracks, shared paths, road markings, surface condition upgrades and horizontal speed reduction measures. In addition, 436 junctions have been treated and 141 access improvements have been made. Over 2,000km of signed routes have also been established. Overall, 645km of route have been improved to the end of the financial year 2008/09. Figure 1 shows the LCN+ Link Map.

Figure 1 The LCN+ Link Map

A Cycle Route Implementation and Stakeholder Plan (CRISP) study is a feasibility study to support scheme planning, programming, design and implementation (TfL, 2005). The CRISP process was piloted with boroughs and cycle user groups being consulted on the approach proposed to be taken. This inclusive approach to their development was an important aspect of their success and universal adoption by managing authorities. The CRISP approach places emphasis on identifying existing problems, local needs and constraints, agreeing issues of concern, and identifying risks to delivery early on. The process is informed by drawings showing design relevant information (such as existing cycle routes, signalised junctions, collision locations and descriptions and statutory undertakers plant locations) and consideration of issues not only on the LCN+ but also on adjacent access routes. The process allowed for the development of a justification of scheme funding and encouraged a continuity of programming of schemes.

The outcomes from a CRISP study are preferred treatment options and the identification of the need for further consultation and modelling, for example concerning signal control, bus priority and other network management issues. Stakeholders included those within Boroughs and TfL, local employers and trip generators, cycling organisations, developers and landowners.

CRISP studies comprise of four stages. In Stage 1 a questionnaire is issued to a wide range of stakeholders eliciting their general opinion concerning the proposed route and giving them the opportunity to state whether they would like to be involved in Stage 2. Stage 1 also comprised the collation and dissemination of relevant existing information on infrastructure condition, traffic flow and the identification of opportunities for growth in flows of cycle traffic. Mapping, usually at 1:2500 scale, was also prepared. Stage 2 comprised the Cycle Route Inspection Meeting (CRIM) which was undertaken on foot or by bicycle. Figure 2 shows a CRIM in progress.

Figure 2 A Cycle Route Inspection Meeting in Progress

Problems and constraints identified in Stage 1 and 2 were then considered and options and recommendations produced in Stage 3, resulting in the issue of a draft CRISP Report. Comments were received from stakeholders in Stage 4 and a final report produced.

Most of the detailed discussion about issues and solutions occurred during the CRIM. Each CRIM usually lasted a full day, with draft CRISP report review meetings lasting half a day. While this was a huge drain on volunteer time, the user community was very willing to take part in the process. A core body of volunteers began to emerge and, without these enthusiastic users, the process would not have been successful. Cycling has a history of attracting enthusiasts and the value of the CRISP approach has been to engage with that interest to help complete a significant information gathering and scheme planning task.

Stakeholders are, by their nature, are self-selecting and this was used to advantage. The majority of CRISP recommendations involve the retrofitting of cycling facilities onto existing highway infrastructure, which requires detailed discussions with people knowledgeable about the needs of cyclists. Only the views of cyclists were gathered at the detailed site visit stage (the CRIM). However, the views of motorists and users of other modes were also sought, but, in order to achieve as wide a range of responses as possible, rather than in on-site discussions, these were elicited through responses to the Stage 1 questionnaire.

When recommending CRISP options at Stage 3, agreement was sought with the borough cycling officer, who would assist in the process of weighing the benefits of cycling specific measures against the needs of other road users. A recommendation would only be progressed if borough officers were satisfied that any negative impacts were either mitigated or minor. The final report was 'owned' by the local authority and they would be committed to the delivery of the specified designs. At the funding stage options not agreed with stakeholders were given a lesser priority than those where agreement was reached and so the CRISP process worked, together with the programme management regulations, to give genuine impetus to the need to find agreement between all parties. This embedded engagement meant that no single stakeholder or officer could dominate proceedings.

The CRISP process was designed not to attempt to find balance, but instead as a way to find solutions that benefit cyclists without impacting unduly on other modes or the local environment. An important issue in the promotion of a scheme is its timing relative to dates for meetings of the authorities which are to make decisions on funding, priority and approval of design. Once the CRISP process was completed, borough officers presented proposals their elected members.

The process was developed and implemented by Transport for London, FaberMaunsell (now AECOM) and the LCN+ Project Management team based at the London Borough of Camden. It set out to revolutionise the process of stakeholder engagement with the specific aim of enhancing scheme design. The process was trialled in four borough areas before being rolled out across London in 2004/05. Over two hundred CRISP studies took place over the next four years, with the majority delivered between 2005 and 2007 (TfL and LB Camden, 2010a). In the three years to 2010, all delivered schemes were informed by recommendations from CRISP studies. Over 600 schemes a year were delivered including 2,065 recommendations from CRISP studies.

An online CRISP datasheet library (TfL and LB Camden, 2010b) was established in order to aid cycle users groups and the general public in understanding exactly what is

planned for cyclists in their area, and the problems that the scheme were designed to overcome. Estimated costs were included. As a separate service to the public a web based mapping system was developed for the public for cycle route planning and attracted over one million hits per month at its peak shortly after the July 2005 bombings (TfL and LB Camden, 2007).

Wilcox (1994) suggests that stakeholder involvement, sometimes also referred to as community engagement, works best when a number of different interests willingly come together, formally or informally to achieve a common purpose. This had not occurred to a measurable extent in highway and traffic engineering and, when the CRISP process was launched, many people suggested that the money involved in engagement could be better spent on delivering more schemes (each study cost in the region of £7,000 to £30,000). The benefits of better scheme design and a reduction in the risk of non-delivery of a scheme are benefits which are difficult to measure but ought to be considered in comparison with the costs.

The user community was very pleased to be involved in the process. The London Cycling Campaign (LCC) had worked for a number of years towards a sizeable investment in a pan-London cycle network and welcomed the opportunity to assist in contributing to the design process (LCC, 2010).

Case Study Example

On the LCN+ Link 27 CRISP study, an issue arose over the use of Kentish Town Road at the northern end of the route which runs between Highgate and Tottenham Court Road. Kentish Town Road forms part of the Strategic Road Network and so any changes made to the highway need to be approved by TfL's Network Assurance Team. When assessing the existing conditions for cyclists on Kentish Town Road during the CRIM, local cycling stakeholders from the Camden Cycling Campaign were concerned that the high traffic volumes coupled with frequent kerbside activity, due to the many shop frontages, meant that the route was unsuitable for cycling. However, the route was popular with cyclists despite these conditions and the accompanying high rate of collisions.

From a project management perspective, the alignment fitted the LCN+ brief of connecting cyclists directly with town centres and so realignment was not deemed feasible. Stakeholders suggested a quiet alternative route be signed to the north of the area so that less confident cyclists could take a safer, albeit more circuitous, bypass route. Their detailed local knowledge was vital in providing this routing option. The Camden borough officer informed the stakeholders of a larger town centre redevelopment plan that was currently being progressed, and so it was decided that the quiet route would be signed, but only at little cost, whilst concentrating cycling funding resources on making amendments to the town centre plan that would benefit cyclists. Cycling stakeholders then attended future design meetings on the town centre redevelopment and the resultant scheme included the introduction of advanced stop lines with associated signal timing adjustments which allowed cyclists to clear junctions and position themselves for turning manoeuvres. Highway changes were made in compliance with the London Cycle Design Standards on the remainder of the route but, importantly, the CRISP offered a vehicle for cycling stakeholders to engage with a large scale scheme and ensure that the existing strategic cycle route was not only maintained but improved. Camden Cycling Campaign is now routinely involved in all Highway Scheme consultations. This case study illustrates one of the main legacy benefits of the CRISP process in that it can be used to introduce cycling advocates to highway engineers, and this in turn ensures that more highway schemes consider the needs of cyclists.

Discussion of the issues and benefits

Introduction

Highway and traffic management scheme users usually have a limited role in the development of highway schemes: they have usually been consulted at certain stages of scheme promotion as required by planning legislation, as discussed above. Local authority engineers, who are responsible for infrastructure in particular specific areas, usually have a very good knowledge of the location, history and particular special features which may affect a scheme's design. The authors are, from experience,

aware, however, that the additional in-depth knowledge that local lay-people may have is frequently not brought to bear on schemes at their design stage. The involvement of lay-people at an earlier stage in scheme design demands learning on the part of both the design engineer and any lay-users who may be engaged in the design process.

This section discusses the complexity of London and the proposals for introducing cycling within a pre-existing highway network. It goes on to discuss the needs of engineers in developing their skills in stakeholder engagement and users needs to develop an understanding of the various engineering codes, specifications, regulations and guidance.

London's complexity

London has a complex transport infrastructure which is different in nature in the inner boroughs compared with the outer boroughs: Inner London has dense mixed land uses and Outer London begins to display a more traditional pattern of local centres served by radial routes. Its contiguous built-up nature makes it a difficult place to overlay a network within a network: a network of routes for cycle traffic within an existing heavily used highway network. Politically it is divided into thirty-three local authorities with Transport for London (TfL) being responsible for specific transport functions and sections of the highway network as defined in the 'London Local Authorities and Transport for London Act' (2003), and amended by the 'London Local Authorities and Transport for London Act' (2008) and the 'Transport for London Act' (2008). TfL is responsible for two major road networks in the Transport for London Road Network (TLRN) which comprises of 580km of high capacity 'A' class roads and the Strategic Road Network (SRN) which comprises of 500km of strategically important borough primary roads where any significant obstruction could impact on the smooth movement of traffic across the city. TfL has complete powers as the Highway Authority for the TLRN, and so far as the SRN is concerned, the Boroughs, which are the Highway Authority, must still seek approval from TfL's Network Assurance Division under the Traffic Management Act (2004). The

Boroughs have complete powers as the Highway Authority over all other non-private highways in London.

The creation of a new cycle route of any length may very likely lie within the jurisdiction of a number of highway authorities. Negotiations concerning the design can, as a consequence take a protracted period of time to negotiate, especially if different political parties hold power on different sides of a boundary.

The CRISP process in fact became a powerful tool to assist in smoothing the path of co-ordination and helping to overcome potential barriers caused by differences in political will along the length of a route. As well as for planning and decision making, CRISP reports were also able to be used confidently as a basis for scheme appraisal and delivery of LCN+ links (Capita Symmonds, 2007).

The number and complexity of CRISP recommendations became a significant burden and as a consequence, schemes were prioritised to ensure continued and effective delivery. The criteria for this prioritisation was based on scheme proximity to barriers to cycling (based on those highlighted in the LCN+ High Risk Infrastructure Barriers report published in November 2006), proximity to key development areas specified by TfL (such as the Olympic sites), proximity to collision clusters using a 50m buffer zone and continuity (based on overall network segment completion). An optimisation score was developed from this weighted criterion and this informed funding decisions at a senior level. Optimisation filters were also applied which effectively removed schemes from any funding source if, for example, they fell within the remit of some more general traffic management scheme. This however, resulted in criticism from LCC, who were concerned at the lack of implementation of proposed works at key barriers and the focus on what were perceived as 'quick wins' (London Councils and LCC, 2008).

Stakeholder engagement skill requirements

At the CRIM stage, skills additional to those usually required within the engineering community were needed. In particular 'soft management' skills in general had been

identified by TfL as a training need for those involved in delivering transport schemes. TfL developed and provided a three module package of training which was offered free to boroughs, consultants and user group representatives. The first two modules developed skills in the use of the London Cycle Design Standards and the final module develop skills, inter alia, in stakeholder engagement and negotiation.

One of the authors delivered a number of training sessions to assist in developing these skills for those who would be involved in delivering schemes to the London Cycling Design Standards. These training sessions covered communication skills mainly based around the idea that communication is two-way and that the ability to ask questions and actively listen to the responses is very important. Emphasis was also placed on the need to reflectively feedback throughout and at the end of discussions. It is also important to be able to identify relevant stakeholders and their nature. Stakeholders may be at different stages of commitment to a scheme ranging from simple awareness to some level of understanding of a scheme, through to support for a scheme or involvement in a scheme, and ultimately to total commitment to a scheme. The training also involved the analysis of both the influence a stakeholder may have on a scheme, together with the impact that the scheme may have on a stakeholder.

The training instructed delegates concerning the different levels of public participation as discussed above (IHT, 1996). At the lowest level this may have been simply as recipients of information about a scheme, the second level of involvement is where they may be consulted on a scheme. A CRISP however, is at the highest level: that of participation. This is very risky so far as scheme designers are concerned because it requires two-way dialogue which will have a direct impact on the outcome and requires changes in attitudes and perceptions for all parties involved.

The training also involved negotiation skills. It was recognised that, particularly in the public sector context, a ‘best deal’ will attempt to maximise the utility for all parties and interests. The importance of preparation for a negotiation was emphasised and that a ‘target’ outcome should be defined before going into a negotiation, as well as

‘minimum’ and ‘ideal’ outcomes defined. The stages of a negotiation were explained including the opening ‘offer’ and the ‘bargaining’ phase.

It was particularly challenging for consultants to work with stakeholders, their preferred method was to work with the borough cycling officer. A degree of firm project management was sometimes required to ensure that stakeholders were fully and properly involved in CRISP studies. Some stakeholders had a history of being trenchant in their views and dealings with borough officers and consultants: in some cases legal actions had been brought between the parties where it was believed that tax payer’s money had been wasted in the past. The CRISP process was offered to stakeholders as an opportunity where past errors could be corrected and future five-year plans could be created.

Some boroughs still benefit from the rapport built up with their local cycling groups over the period of implementation of the LCN+. Good will is maintained in routine consultation with cycle groups on many large schemes and the universal acceptance that all traffic schemes have an impact on cycle users.

Engineering knowledge requirements

The London Cycling Design Standards (LCDS) (TfL, 2005) provides guidance and a common language for scheme design. Training was given to both stakeholders and engineers.

Despite the stakeholder engagement skills training, LCDS and the philosophy behind the process, some stakeholders complained that their voices were not being properly heard, and that they felt excluded by engineering ‘jargon’. A significant issue which frequently cropped up in this regard was linked with a cycle user’s suggestion being moderated or eliminated for reasons linked with junction capacity. Others concerned borough policy linked with for example, traffic calming, or some feature of design such as coloured surfacing. Barriers remained concerning some of these issues and for someone who had taken a day off work to assist, this could be very hard to take and passions could be easily aroused.

Spinney (2009) discusses the barriers to engagement and the process of professionalization of the cycle users groups from their perspective, and concludes that the relationship between scheme promoters and stakeholders remained hierarchical with lay knowledge being marginalised.

Wider benefits

The CRISP process generated wider goodwill for the process of cycling scheme promotion in London. As well as being championed by Transport for London, schemes were also being championed by board members of cycle users' organisations. These people were, in some cases, gifted public speakers and excellent public affairs lobbyists, and they were able to generate local, regional and sometimes national news coverage about the cycling 'revolution' happening in London. This no doubt helped to keep open the commitment in the political arena to the schemes and their funding.

Involving stakeholders closely in scheme promotion means that 'sound bites' delivered to the media are well informed. Given the importance of movement and transport in society, it is vital that the problems and solutions are debated accurately.

Further developments of implementation and stakeholder plans

Since the conclusion of the LCN+ project the CRISP process has been adapted to work on other cycling projects in London. Re-branded as the Cycle Super-Highway Implementation Plan (CHIP) process, it has been used on the proposed Cycle Super-highways. CRIMs have been attended by as many as twenty to thirty people, much larger than the five or six usually present for the LCN+ CRISPs. This resulted in some CRIMs being split into three or four groups, with recommendations collated and discussed on completion. This helps to reduce the disproportionate effect that one individual may have on the process and helps ensure balanced judgements. Subsequent to CRISP involvement, local stakeholders have been engaged via an on-line workplace travel planning portal that is available for all businesses of any size

within 1.5km of the proposed Cycle Super-highway. Businesses are offered incentives for involvement such as cycle parking spaces and travel plan guidance. The Cycle Super-highway works to an approximate 60:40 split of 'Hard' (infrastructure) to 'Soft' (promotion and travel planning) measures. This comprehensive approach is a lesson learnt from the promotion of the London Cycle Network Plus, which focussed solely on infrastructure delivery. The Cycle Super-highways will also benefit from detailed outcome monitoring and the establishment of a robustly estimated baseline of use, which has not been undertaken on a project by project basis in the past.

The Biking Borough Project, which aims to promote local trips by bicycle in the outer London Boroughs, has adapted the CRISP method of stakeholder involvement to consider entire boroughs in order to highlight new routes, potential cycle hubs and barriers for cycling. Stakeholders from local cycling groups were invited to work alongside consultants on the basis of themselves being paid a fee. This was an attempt to acknowledge the expertise in cycle facility design that many stakeholders possess. It has the advantage of giving engineers access to an enthusiastic workforce who will evaluate routes and areas and provide expert local feedback. This has been found to have the effect of reducing dramatically the period of time needed to complete a CRISP, with its net cost saving implications.

Stakeholders scored the level of service of links and junctions based on quality assessment criteria rated on a scale of 1-4. Stakeholders developed a User Quality Assessment system with a rating of 1 being assigned to safe, continuous, enjoyable and easy to use routes; a rating 2 of indicating that a route may contain obstacles, be unattractive, badly lit or poorly signed; a rating 3 indicating that a route is incomplete, indirect or contains major obstacles; and a rating of 4 indicating that a route is rudimentary and contains no specific advantages for cycle traffic.

Although the rating system does not have the same extensive range of objectively measured inputs as the IHT cycle audit and review system (IHT, 1998), which methodically evaluates road type characteristics, the usability and sense of ownership of the User Quality Assessment (UQA) makes it a valuable new tool for planning. The data produced has been of great value in highlighting areas where remedial work

is needed and in designing cycle networks. The UQA system, in contrast to the IHT system, provides information on what could and probably should be present as features along a route rather than being a rating of how suitable a route actually is as it stands. Parkin and Coward (2009) compared the IHT system with models based on ratings from a range of users: it would be valuable to undertake a similar comparison with the User Quality Assessment system.

Further developments of the system may allow the data produced to be fed into cost and benefit appraisal. The concept of user assessments to inform policy and funding decisions is an interesting component of the LCC User Quality Assessment method.

The approach of paying stakeholders as part of the team is a radical departure from previous methods of stakeholder engagement and may not be practicable for works focussed on other modes. A good outcome for a stakeholder without payment would have been that his or her ideas were treated with respect and incorporated in the scheme proposal more or less as suggested. On the basis that the stakeholder is being paid for his or her consideration and input, a good outcome for the stakeholder may be that their data and knowledge has been satisfactorily used in the scheme development. Arguably, however, some may see the process as one of 'buying-off' the stakeholder. It should be noted, however, that cycling stakeholder organisations in London are sophisticated professional bodies who themselves offer consultancy services to businesses and authorities. They are specialists in stakeholder co-ordination and management and so are open to financial remuneration for the provision of this service. The Cyclists' Touring Club and Sustrans have been operating under this model nationally for a number of years, and the growth of stakeholder organisations into bodies which carry weight and influence is an interesting process for further study.

Cycle users' voices have always been disparate in their suggestions for action. It is clear, however, that there is willingness amongst the cycling community to learn about highway and traffic engineering and engage with the process of scheme development. This willingness is arguably because of the historic intransigence of policy makers and implementers to create a network suitable for cycle traffic.

Conclusions

Designing for cyclists is complex and needs specialist skills. Even small errors in design can result in, for example significant lack of comfort, lack of fitness for purpose and, perhaps more importantly, the possibility of severe collision types. The importance of both strategic thinking and attention to detail, as evidence in the case study, comes from the nature of the bicycle and rider being exposed to the environment through which they travel, the fact that the cyclist provides the motive power and the fact that the physical nature of the bicycle-rider combination is significantly smaller than the size of motor vehicles.

Having informed users and skilled designers both together engaged in discussion about scheme design is vital for the successful promotion of schemes to improve conditions for cycle traffic. The CRISP process has helped to develop a cohort of well informed engineers and well informed cycle users more readily able to engage with each other around the difficult task of cycle scheme design. The path towards overcoming the concerns of users, for example as expressed by Spinney (2009), was begun in the CRISP process and needs to continue. The task of educating engineers about cycle scheme design requirements also continues.

References

Capita Symmonds (2007) *Review of a sample of Final CRISP reports for compliance with the CRISP Brief*. Report for Transport for London

CROW (2006) *Design Manual for Bicycle Traffic* (Dutch version April 2006, English version June 2007), Ede, The Netherlands: Centre for research and contract standardisation in civil engineering.

DfT (2008) *Delivering a sustainable transport strategy*. Department for Transport. www.dft.gov.uk

<http://www.dft.gov.uk/webtag/documents/expert/unit3.14.php>

- EC (2004) *Successful transport decision-making: a project management and stakeholder engagement handbook. Volume 1: concepts and tools*. European Commission, Directorate-general for energy and transport.
- IHT (1996) *Guidelines for developing urban transport strategies*. The Institution of Highways and Transportation: London.
- IHT (1997) *Transport in the urban environment*. The Institution of Highways and Transportation: London.
- IHT (1998) *Guidelines for cycle audit and cycle review*. Institution of Highways and Transportation, London
- LCC (2010) London Cycle Network Plus (LCN+), London Cycle Campaign. <http://www.lcc.org.uk/index.asp?PageID=222> [Accessed, 22nd April 2010]
- London Councils and LCC (2008) *Breaking down barriers to cycling in London. A joint papers by London Councils and London Cycling Campaign*. www.londoncouncils.gov.uk
- Parkin, J. and Coward, A. (2009) Comparison of methods of assessing routes for cycle traffic. *Proceedings of the Institution of Civil Engineers, Municipal Engineer* **162** (1) pp7-14.
- Parkin, J. (2010) The planning required for walking and cycling networks. In: Banister, D. and Givoni, M. *Integrated Transport: from policy to practice*. Routledge/Taylor and Francis. Chapter 9.
- Wilcox, D. (1994) *The Guide to Effective Participation*, Book published by Delta Press Brighton
- Spinney, J. (2009) Mobilising sustainability: partnership working between a pro-cycling NGO and local government in London (UK). Paper presented at the 6th Cycling and Society Research Group Seminar held at the University of Bolton, 7th-8th September 2009.
- TfL (2004) *The Mayor's London Cycling Action Plan*. Transport for London.
- TfL (2005) *London cycling design standards*. Transport for London.
- TfL (2010) London Cycle Network <http://www.tfl.gov.uk/corporate/projectsandschemes/3188.aspx> [Accessed 22nd April 2010]

TfL and LB Camden (2007) *London Cycle Network Plus (LCN+) Annual Report 2005/06*. Transport for London and London Borough of Camden.

www.londoncyclenetwork.org

TfL and LB Camden (2010a) *London Cycle Network Plus (LCN+) Annual Report 2008/09*. Transport for London and London Borough of Camden.

www.londoncyclenetwork.org

TfL and LB Camden (2010b). Crisp datasheet library

<http://www.londoncyclenetwork.org.uk/DMS/downloaddatasheet.aspx>

Figure 1 LNC+ Network



Figure 2 CRIM in progress

