

## Cite this article

Hancock L and Parkin J

The challenges of applying cycling design guidance.

*Proceedings of the Institution of Civil Engineers – Transport*,

<https://doi.org/10.1680/jtran.22.00068>

## Research Article

Paper 2200068

Received 02/08/2022;

Accepted 14/04/2023;

First published online 30/04/2023

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Transport

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# The challenges of applying cycling design guidance

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Cycle infrastructure provides a means for everyday travel by a mode that is efficient, benign to the environment and confers health benefits on the user. The UK Department for Transport has a funding stream dedicated to providing grants to English highway authorities to construct cycle infrastructure in accordance with guidance in *Local Transport Note 1/20 Cycle Infrastructure Design*. This guidance was published in 2020 and is beginning to be widely used. The challenges of applying the guidance are investigated in this paper. For this study, 13 semi-structured interviews were undertaken with politicians, managers, engineers and cycle users. The interview results revealed that, although there is ambition to deliver appropriate schemes and there is an inspectorate (Active Travel England) to assist in ensuring schemes comply with the guidance, there are constraints. These include the limitations of short-term and medium-scale funding preventing larger-scale outcomes, a lack of understanding of the extent to which a designer can adopt relaxations from the guidance and skills shortages. It was, however, encouraging to find that the participants were aware of the fundamental need to separate cycle traffic from both motor traffic and pedestrians.

**Keywords:** cycle infrastructure/design/funding/skills/UN SDG 11: Sustainable cities and communities

## 1. Introduction

Good-quality and extensive cycle infrastructure can create coherent networks of routes that are direct, safe, comfortable and attractive to travellers (Crow, 2017). Such networks will serve people who currently cycle and, importantly, may encourage people to cycle if given suitable conditions. Cycling contributes to transport efficiency because of the relatively small size of cycles, which demand less space than motor vehicles (Parkin, 2018). The inherent physical activity of cycling also creates health benefits for the rider. Cycling is less carbon dioxide intensive per kilometre than a motor vehicle and does not pollute the air or create noise. Compared with motor vehicles, it also poses less risk to other road users. Cycle infrastructure schemes represent good value for money because of these benefits. The European Cyclists' Federation points out that cycling as a transport solution supports ten of the 17 UN Sustainable Development Goals (SDGs) (SDGs 1, 3, 5, 7, 8, 9, 11, 12, 13 and 17) (ECF, 2017). It especially supports UN SDG 11, to make cities and human settlements inclusive, safe, resilient and sustainable.

The *Cycling and Walking Investment Strategy*, published by the UK Department for Transport (DfT) (DfT, 2017a), was put in place to double, in England, the number of stages of journeys for which cycling is used from 0.8 billion in 2013 to 1.6 billion by 2025. At the same time, guidance was issued to local authorities to assist them in planning routes for walking and cycling (DfT, 2017b). This guidance requires local cycling and walking

infrastructure plans (LCWIPs) to be created, detailing network proposals. This planning process involves consideration of demand and desire lines, auditing of existing infrastructure and network planning.

With the need to enhance the quality of cycle infrastructure recognised, *Local Transport Note 1/20 Cycle Infrastructure Design* (LTN 1/20) was published in 2020 (DfT, 2020a), which supersedes *Local Transport Note 2/08 Cycle Infrastructure Design* (DfT, 2008) and *Local Transport Note 1/12 Shared Use Routes for Pedestrians and Cyclists* (DfT, 2012). The requirements of LTN 1/20 (DfT, 2020a) are aimed at significantly enhancing the quality of cycle infrastructure. The separation of cycle traffic from motor traffic above certain flows and speeds is emphasised, as is the need for separation from pedestrians. Crucially, in the foreword to the guidance, the minister of state with responsibility for cycling and walking, Chris Heaton-Harris, noted (DfT, 2020a: p. 3)

It will be a condition of any future Government funding for new cycle infrastructure that it is designed in a way that is consistent with this national guidance.

The government at that time intended that all schemes would be checked by an inspectorate specifically created to perform that task. After operating in shadow form, the planning and inspectorate body Active Travel England became operational in summer 2022 and this body will ensure that new infrastructure is in line with the design guidance.

A new policy in England for cycling and walking was published in 2020 (DfT, 2020b). The policy heralded a ‘gear change’ in approach to make places ‘truly walkable’ and make cycling a mass form of travel. The aim is to make cycling and walking the natural first choice for many journeys, with half of all journeys in towns and cities being cycled or walked by 2030.

The *Second Cycling and Walking Investment Strategy* was published in 2022 (DfT, 2022). It outlines £3.8 billion of funding until 2025, which includes elements of wider government funding including National Highways Designated Funds, a proportion of City Region Sustainable Transport Settlements, the Integrated Transport Block Grant, the Highways Maintenance Fund, the Levelling Up Fund, the Future High Streets Fund and the Towns Fund. It is notable how fractured funding is in England for local transport initiatives.

Three tranches of Active Travel Fund grants to construct networks and elements of cycle networks have been issued to local authorities based on bids they have made to the DfT. Tranche 1 was awarded in May 2020 and supported the installation of temporary projects in response to the Covid-19 pandemic. Tranche 2 followed in November 2020 and this supports the creation of longer-term projects. Tranche 3, which was announced in May 2022, consists of 134 schemes, costing £161 million.

The role of Active Travel England, as the inspectorate responsible for ensuring the guidance in LTN 1/20 is adhered to, should mean that infrastructure quality improves. However, there are significant challenges for local authorities within a system that has a variety of funds for cycling investment and a significant increase in the volume of work, which must be carried out to guidance that designers may not be familiar with and may need to be trained to use.

The issue of the difference between standards and guidance is an important one. The *Design Manual for Roads and Bridges* (DMRB) is the standard used for the design of trunk roads in the UK. It is particular about the verbal forms used, with ‘shall’ indicating a requirement of the overseeing organisation and ‘should’ indicating advice expressed as a recommendation (NH, 2021a). The standard for designing for cycle traffic on the trunk road network (NH, 2021b) uses shall and should 110 and 22 times, respectively. LTN 1/20, by contrast, uses shall and should 3 and 589 times, respectively. This leaves greater room for possible doubt as to exactly what may be acceptable by an inspectorate checking local authority designs and construction. This may be an advantage in that designers have greater flexibility and they can use greater creativity in design, especially when there are site-specific constraints. The disadvantage is that critical lower bounds relating to serviceability and risk may be compromised by unknowing designers.

In summary, there is an ambitious central government programme to increase the extent and quality of cycle infrastructure

in England. Local authorities are responsible for delivery – they need to bid for central government funds and then design according to the guidance in LTN 1/20. Finally, they need to satisfy Active Travel England that their design and construction is of sufficient quality.

However, the provision of comprehensive networks of good-quality cycle infrastructure within the UK context does not have a long pedigree and there is therefore a process of development taking place about how design guidance should be applied in practice. The increase in volume of cycle infrastructure design and construction may have implications in relation to available skills within the industry.

The aim of the research reported in this paper was thus to investigate the attitudes and behaviours of local policymakers, project managers, design engineers and users to the issues around the design and delivery of cycle infrastructure in England. This will allow for a deeper understanding of the relevant issues.

The rest of the paper is organised as follows. Section 2 presents a review of the relevant literature in the field and identifies gaps in knowledge. Section 3 outlines the methods used to understand the attitudes and behaviours of decision makers, managers and designers. Section 4 presents the results, which are discussed in Section 5. Conclusions are presented in Section 6.

## 2. Literature review

This literature review summarises the nature of actors and actions in relation to the delivery of cycle infrastructure in terms of policy, project management, design and the contributions of cycle users.

Leyendecker (2020) compared the cycle policies in Newcastle upon Tyne (UK) and Bremen (Germany) and noted that Newcastle’s policy seeks to promote cycling, but has not yet articulated how appropriate space for cycling within the public realm will be created. This conundrum has been at the heart of much policymaking in the UK. Feddes *et al.* (2020) make the point that, even in Amsterdam (the Netherlands), the change in culture, policy and then planning and design for cycle traffic has been a long and complex process of change and development. They make the point that a ‘consistent series of crucial choices combined with decades-long hard work’ (Feddes *et al.*, 2020: p. 150) was required by many stakeholders. Further, Plyushteva and Barnfield (2020: p. 207) considered Sofia in Bulgaria as an example and noted that the politics of a cycle lane are ‘never confined to an individual street’, but rather they become questions about area-wide traffic flows and political priorities. These studies point to contradictions in policymaking evident as omissions in creating an appropriate breadth of policy, the need for long-term consistent action and a willingness to engage in changes beyond those needed just for cycling.

In relation to the management of the 300 Dutch fast cycleway initiatives, Lagendijk and Ploegmakers (2022) interviewed planners, engineers and cycling advocates; at the time of their research, 52 schemes had been constructed. They noted the following six practices referred to in the interviews as of relevance.

- The nomenclature for the routes (in Dutch, *snelle fietsroute* (fast cycle routes)) and their framing as solutions to motor traffic congestion.
- The standardisation, through technical advice documents, of their design and construction.
- Tightly drawn collaborative agreements to define the expectations of municipalities in relation to the quality of the infrastructure in exchange for the grant monies awarded to them by the provinces.
- The need for a high level of negotiation and diplomacy with local populations at the planning stage.
- Financial ingenuity linked with managing the programme.
- Design negotiation and compromises, for example in relation to the balance between competing junction priorities and safety.

While this research identified the key practices for success, albeit in a different policy and funding environment to England, it also demonstrates a significant range of complexity – perhaps beyond that for the delivery of other types of transport schemes. This paper presents findings for infrastructure development work of a similar nature in the UK context.

The process of developing design practice is continuous, as evidenced by the early plea of Taylor and Filmer-Sankey (2002) for design standards to be updated so that the latest theory can be translated into widespread practice. In a comprehensive review of approaches to the design of cycle infrastructure in the 33 local authorities in London, Deegan (2016) noted a reliance by designers on shared-use footways, the point being that this type of provision, as opposed to properly separated provision, could reduce the propensity for people to cycle (Parkin, 2018: section 3.3). These sorts of design decisions point to attitudes and (erroneous) understandings that designers may have about the nature of cycle traffic.

In the Australian context, Bell and Ferretti (2015: p. 352) noted a failure to adequately support the delivery of convenient, attractive and safe cycling routes and facilities and that a ‘large shift in emphasis and affirmative action is required’ to change entrenched planning practices. Also in the Australian context, Rose (2015) noted that no requirement for transport content is included in requirements for civil engineering degree programmes. While this has hitherto also been the case in the UK, the Joint Board of Moderators (JBM), which accredits civil engineering degree programmes, has recently updated its guidelines and it expects to see the fundamentals of transport covered in the curriculum (JBM, 2022a). A webinar training

session for universities (JBM, 2022b; run on behalf of the JBM by one of the authors (JP)) demonstrates the nature of content that might be expected of universities when teaching transport. The guidelines emphasise the culture change needed in education to deal with the climate crisis and moves to carbon dioxide neutrality. The webinar discusses the fact that a much more holistic approach needs to be adopted for urban street design, which is inclusive of all types of street user. That the JBM guidelines have only recently changed and training of universities is now required points to the fact that engineers’ behaviours need to be developed in transport engineering design for cycle traffic.

Deegan and Parkin (2011) reviewed the planning processes for the London Cycle Network Plus. They noted the complexity of designing for cycle traffic and the requirement for specialist skills – this is because there can be severe consequences for even small design errors in relation to the comfort of, and risks posed to, cyclists. They concluded that cycle users’ knowledge is valuable in the design process, but that the level of involvement needed is greater than has historically been the case and is novel for transport planning and engineering. Aldred (2012) traced the disparate nature of the identities of people who form the cycling advocacy community and the different forms that advocacy takes, making the point that high levels of commitment and enthusiasm of the advocacy communities offer hope for change.

An increasing and more recent focus has been placed in the literature on disabled cyclists and the nature of the cycles they use. Hickman (2016) noted that the need to consider disabled cyclists is to reduce the number of times they are either ‘inconvenienced or excluded’ from cycle infrastructure. Gaffga and Hagemester (2016) noted that the main problems for non-standard cycles (e.g. tricycles and trailers) are obstacles such as chicanes, bollards and inadequately dropped kerbs. Clayton *et al.* (2017) noted that the requirements of disabled cyclists are increasingly being taken into consideration in infrastructure design guidance, but that more research is needed.

In summary, it is known that there are challenges in practice in delivering appropriate cycle infrastructure and that there are many actors who influence outcomes in the domains of policy-making, project management, design and user engagement. There is a gap in knowledge about how the current English funding regime is being carried out by scheme deliverers. This research seeks to explore these issues.

### 3. Methodology

A qualitative study design was used to explore the complex issues connected with the design and delivery of cycle infrastructure being retrofitted within public highways in England with those who have direct experience of the issues. Semi-structured interviews were used because the roles that different interviewees perform within the context of design and delivery

mean that their experiences, attitudes and behaviours would likely be different.

The context of the study was a rural unitary authority in England. While the mechanisms for funding and the design guidance are the same in rural and urban areas, the geographical context of rural areas presents additional complexities. Compared with urban areas, in rural areas, the distances between origins and destinations for everyday trips may be longer and speed limits on roads may be higher. The built urban environment is clearly different from the natural rural environment, which may include smaller settlements and land uses that are agricultural. This different context may expose additional issues for the introduction of cycle infrastructure which are worth exploring.

Individuals with experience of the conception and execution of cycle infrastructure design schemes were purposely recruited from across a range of roles linked with scheme delivery. Schemes are generally put into effect by civil engineers, and civil engineering is a male-dominated profession. However, to have value as a mass form of travel, cycling needs to be attractive to all sections of society. As a result, emphasis was placed on recruiting evenly across gender to ensure that the richest variety of opinion was captured.

In virtual meetings using Microsoft Teams, 13 interviews were conducted in the period from 16 September to 15 October 2021. The 13 people interviewed comprised four politicians, two managers, five design engineers and two cycle users. Eight interviewees were female. Each interview was recorded and transcribed, and notes were made by the interviewer (LH).

Thematic analysis was conducted. NVivo software was used to create codes (based on recurring cognate responses) that were then grouped into themes and sub-themes by LH and validated by JP. Ethical approval was granted by the University of the West of England, Bristol.

#### 4. Results

Table 1 summarises the themes and code descriptions. Each theme is discussed in turn in the following sections. Quotes from the interview participants are coded with P for politicians, M for managers, E for engineers and U for cycle users.

##### 4.1 Decision making

There was evidence from a politician that they thought that increasing the number of cycle trips is possible. An engineer suggested that aiming for the highest mode share possible was the best way forward.

The highest is 5% of commute trips increasing to 13%... but theoretically, at least 20 to 50% (P2)

Table 1. Themes and description of the codes

Theme	Description of codes
Decision making	<ul style="list-style-type: none"> <li>■ Increasing cycle trips is possible</li> <li>■ Quality, separated infrastructure is needed</li> <li>■ Constraint of alternatives is required</li> <li>■ More political ambition is required</li> </ul>
Funding and timescales	<ul style="list-style-type: none"> <li>■ Level of funding</li> <li>■ Mechanisms and timescales</li> </ul>
Design issues	<ul style="list-style-type: none"> <li>■ Issues of compliance</li> <li>■ Retrofitting within the highway</li> <li>■ Rural applicability</li> <li>■ Separation of pedestrians and cyclists</li> <li>■ Separation from motor traffic</li> </ul>
Further guidance development	<ul style="list-style-type: none"> <li>■ Quiet lanes</li> <li>■ Junction analysis</li> </ul>
Professional skills	<ul style="list-style-type: none"> <li>■ Resource, knowledge and skills gaps</li> </ul>
Stakeholder engagement	<ul style="list-style-type: none"> <li>■ More engagement with users is required</li> </ul>

Netherlands is about 50%, in rural areas... we are currently at 2 to 3%. There are no technical reasons why we couldn't reach Dutch standards... we should be aiming for the maximum (E1)

Users pointed to the lack of quality infrastructure as the main reason for the low cycling mode share.

Vehicles put people off... the thing people say when you ask, is they don't like cycling in mixed traffic (U1)

If you want people to cycle, you must give them that suitable infrastructure because otherwise, they can't do it. We don't tell people in cars to go off and drive without giving them a road (U2)

There may be common ground between users and politicians in relation to separated infrastructure for cycle traffic. However, there may be misconceptions among politicians about the availability of the car within the population.

We love bikes, we'd love to do more low-traffic neighbourhoods, but if it doesn't get in the way of cars (P1)

The cabinet [highest level of local authority decision making] assumes that everyone is a motorist... the 2011 census showed a quarter of households didn't have a car (U2)

There was agreement among politicians, users and managers about the need to constrain the use of alternatives to cycling by reducing the appeal of travel by car, and that there is a variety of forms that the constraint can take. Importantly, a user's view echoed a manager's view that car travel may be too easy compared with cycle travel.

They [politicians] need to accept that cars have to be disadvantaged (U1)

I don't think LTN 1/20 can change the world on its own... even more must be done to make things more difficult for car drivers (U2)

A lot of it comes down to cost, I think it is well documented that the cost of motoring has fallen as a proportion of income (M1)

You need to have constraints on car usage, reductions in parking in city centres... roll-out of car clubs, implement low-traffic neighbourhoods, modal filters ... people-friendly streets (P2)

This suggests that quality cycling provision is not sufficient on its own to create modal switch. There were some complex views expressed around the ambition to create modal shift, with one politician suggesting LTN 1/20 is problematic. Linked with this, a manager questioned whether the philosophy of LTN 1/20 is genuinely supported by politicians.

Politicians won't be ambitious enough... (to) reallocate road space and take away from motor traffic. LTN 1/20 is so good that the best will be the enemy of the good (P1)

I'm yet to be convinced that it is politically backed... there are differing views between the message from central government to what is being achieved within this authority (M1)

In contrast, one engineer was very positive about LTN 1/20 as it is so much more of a radical approach than has been adopted previously in England.

We have been trying to do cycling and walking for years... so this more radical approach is key... We are 40 years behind the Netherlands, but the negativity surrounding their changes is forgotten (E5)

Overall, it is apparent that the appetite for increasing cycle mode share within central government is not shared ubiquitously at local level. Both a manager and a user thought local authorities have recently displayed poor political ambition and should have persisted more strongly with the Covid-19-pandemic-related Active Travel Fund tranche 1 projects.

Councils... should have stuck with... temporary pop-up schemes and built on that... there has been some vocal backlash... but that started to settle down (M2)

Unfortunately... they caused a lot of opposition... Interestingly, when they did the consultation at the end, the people who voted to take it out only got 51%, and the people who wanted it to stay in were 49% (U2)

On the other hand, there was a view from an engineer that the Covid-19 pandemic infrastructure may have provided some element of positive change in relation to political decision making, because authorities were requested to trial schemes.

Covid-19 was good in forcing local authorities to trial things and use experimental orders that have been available to them for a long time, but they are always very reluctant to use (E1)

#### 4.2 Funding and timescales

There was a common opinion among all participants that the level of funding is not appropriate, nor is it allocated fairly among rural areas in comparison with urban areas. Some expressed frustration that the current funding level is preventing a level of mode shift towards cycling that could occur in rural areas and is still, in their view, misdirected to the trunk road network.

All the money will go into urban areas (P1)

Level of funding isn't enough, no, xxx's annual grant from the DfT for highways-related infrastructure is circa 23 million. For the first round of active travel schemes, our grant application was circa 700 000. As a proportion, that is 3% (M1)

The government have put 27 billion towards roadbuilding compared to 0.5–1 billion for walking and cycling (E2)

In a very pragmatic manner, a user pointed out that funding levels cannot be high enough because no visual improvements are apparent as a result of them.

There doesn't appear to be any level of funding... nothing is being built (U1)

Turning now to funding mechanisms and timescales, a politician thought the existing funding mechanism is flawed because it encourages smaller schemes that are deliverable in the short term but which may not have longer-term impacts.

We want... long-term funding distributed through ambition via the LCWIPs... you tend to have pop-up funding with a brief time to bid for and deliver it... you are forever doing the easy things (P1)

In contrast, one manager thought timescales of funding were problematic because they effectively mean a local authority needs a scheme designed and ready at an early stage before funding is secured.

The challenge for us is to have designs ready and shelved... but then you have almost entirely designed and paid for something that might not ever get implemented... if we aren't doing a good enough job at that point, then we lose out on future money, it is all a bit of a vicious cycle (M2)

### 4.3 Design issues

#### 4.3.1 Level of compliance

In relation to the required level of compliance to LTN 1/20, a politician and an engineer thought that the requirements are more ambiguous than those in the DMRB, but this may help deliverability.

Must, shall and should make the advice clearer to designers and less ambiguous [in the DMRB]. However, it can limit the design because it is so stringent (E2)

You need to have flexibility... because otherwise, we won't deliver anything with the current political leadership and funding level (P2)

Overall, LTN 1/20 – being guidance rather than a standard – is seen as beneficial because of the flexibility it allows, but there was disagreement among users.

You should do things... they shouldn't be optional... cyclists want... equality with other road users... infrastructure should be for everybody (U1)

I don't think the guidance can be fully implemented, there has got to be compromises in some places, and I don't think that has been worked through (U2)

So, while some users stated that the guidance should be just as clearly defined and high-quality as highway design documents, others recognise there could be places where compromise is needed. A manager thought that LTN 1/20 is as strong as the DMRB standards, but was not convinced that this was beneficial.

It says the designer should be someone who cycles... we have had criticism from the public who picked that up and asked, has the designer cycled the route? Are they regular cyclists? When the answer is no, they don't think that person is capable of doing the design work (M2)

It is interesting that consideration has not been given to remedying any lack of cycling experience among the design team. This may be coupled with a wider lack of knowledge and skills in relation to design (see the comments below on professional skills).

One engineer noted that inspection by Active Travel England is likely to increase compliance with LTN 1/20.

What is clever is how the funding will be linked to compliance... the policy behind LTN 1/20 is as important as LTN 1/20 itself (E5)

More subtly, a manager noted that there could be future funding implications resulting from lack of compliance on

current projects and that this may influence whether they choose to deliver a scheme at all.

If we are governed by future funding via how we deliver LTN 1/20-compliant schemes, there is a chance we wouldn't deliver a scheme at all because it would affect the future funding for other schemes (M2)

One of the engineers thought there were no excuses for a client who does not want to install an approved layout.

I have seen clients say ideas in LTN 1/20 might be a step too far for X location, but it is an approved layout if it is in the book (E4)

Equally, a manager warned against a desire for the best being the enemy of the good.

As highway authorities, we have got the choice of whether we follow the advice. Still... it is difficult to justify if you are going away from that. I think some in some locations it might be that excellent gets in the way of good (M2)

#### 4.3.2 Retrofitting

Most schemes will involve retrofitting cycle infrastructure within the existing highway. Two managers thought that retrofitting LTN 1/20 designs within rural areas is not possible.

The road network isn't set up for active travel modes... Trying to provide local infrastructure that takes cyclists away from vehicular traffic is almost non-existent in terms of achievability within the confines of the highway (M1)

Space is premium... design criteria that needs 5 metres of space... in many scenarios doesn't exist (M2)

#### 4.3.3 Rural applicability

One engineer thought there were additional challenges with the rural applicability of the guidance and this is linked with motor traffic speeds and the lower potential demand for cycling. However, a user suggested that it is possible to deliver a greater length of infrastructure for the same investment as compared with an urban area.

Speeds are high, many rural roads don't have footways... there is also issues of lower demand due to lower populations (E1)

You'd get a lot more cycle lanes, etcetera for the same money... everything could be achieved for the price of one road (U1)

An engineer and a user suggested that there is urban bias to the guidance in LTN 1/20.

LTN 1/20 undoubtedly has an urban bias... (E5)

I don't think you can often retrofit this sort of thing... with the amount of road space that we already have. We need to know how to make the best of that (U2)

Similarly, an engineer thought LTN 1/20 is not as applicable to rural areas as urban environments.

Most people live in urban environments. A significant amount of our population is in built-up areas. Therefore, if you want to maximise investment or maximise applicability then weight it more to dealing with urban environments (E2)

#### 4.3.4 Separation of pedestrians and cyclists

Most interviewees recognised that LTN 1/20 sets a high standard for design, and this was welcomed in relation to the separation of pedestrians and cyclists.

When flows are high, no one likes shared space. Beautiful spaces are pointless if they are full of angry people; bikes and pedestrians don't mix well (P1)

Shared use disturbs my flow because you always want to go faster than pedestrians... I'd prefer they weren't mixed... it is best not to introduce conflict (U1)

However, there was recognition from an engineer that relaxations may be required in order to avoid the possibility that a scheme does not get built at all.

...If we didn't have shared use, pinch points would be tough to overcome... If you have an 80%... segregated route, not delivering that whole route because of one minimal constraint... would be a bad outcome (E2)

It was apparent that schemes within rural areas in the past have generally defaulted to using shared routes for pedestrians and cyclists, and so this development in the guidance is welcomed. However, a manager noted that shared-use routes may be more appropriate for rural areas than urban areas because of lower flows.

The expectation you are achieving 300 cycles per hour is overly optimistic. This is where shared use is most appropriate to provide that linkage (M1)

One manager also noted that rider confidence was relevant.

Individuals willing to ride mixed with traffic are unlikely to be swayed by... a shared-use path beside them (M1)

#### 4.3.5 Separation from motor traffic

The development process in design is quite long and complex, and each element and decision needs to be justified. One engineer thought that the justification for cycling infrastructure may, however, be skewed.

You don't justify a bridge based on the number of people currently swimming across a river; however, many decisions about cycling are made on similar assumptions (E2)

This suggests that traffic counts to determine design criteria are inappropriate, but the LCWIP transport planning process (DfT, 2017b) should of course be used instead to forecast flows. Table 4.1 in LTN 1/20 provides guidance on when to separate cycle traffic from motor traffic based on motor traffic flow and speed. While an engineer thought that the table provides appropriate guidance, they noted that the individual riders' different levels of confidence needs to be accounted for.

For me, cycling in 30 miles an hour [48 km/h] traffic is alright. But the parent of an 8-year-old kid... mixing with potentially life-taking traffic? (E5)

Where traffic is moving at 10 mph [miles/h; 16 km/h], but busy... it is an uncomfortable place to be... the inverse is also true (E5)

This suggests that there will always be variability in the level of attractiveness and comfort experienced by different riders in the same conditions, and hence serviceability level criteria mandated in guidance may remain below an acceptable level for some riders. A manager and a user, however, considered that the distance ridden in the prescribed condition and the mix of types of vehicle in the flow are also of relevance and should be included in table 4.1.

One factor that the table doesn't consider is distance. If you are asking someone to cycle on a 30 mph [48 km/h] road with 6000+ vehicles over 500 metres, I believe competent cyclists would see that as acceptable. But for 5 miles [8 km], the answer may be different (M1)

More of an issue is the mix of vehicles (U2)

Reducing traffic speeds by introducing a 20 mph (32 km/h) speed limit has the effect of reducing the need for physical infrastructure, but a politician and a user noted the need for the enforcement of speed limits.

The only way you can enforce 20 miles an hour is by having average speed cameras (P1)

You need the police out there; there are loads of people doing close passes or driving over the speed limit; that is road crime (U1)

#### 4.4 Further guidance development

Politicians and engineers had views on ways in which the guidance could still be improved in relation to quiet lanes (country lanes that are traffic calmed) and junction analysis.

Guidance says if you are going to put quiet lanes in, make sure none of the signage is too obtrusive because we don't want to distract car drivers. That is precisely what you want to do. You

want to distract the car drivers; you want them to make them feel like they're guests (P1)

LTN 1/20 doesn't detail one of the key barriers: motor traffic capacity calculations and how junctions in the road network are modelled (E2)

#### 4.5 Professional skills

Most respondents thought there are resource, knowledge and skills gaps, and these are holding back the delivery of cycle infrastructure.

Irrespective of the funding levels... There is a resource and knowledge gap... If the DfT say 'Have £15 million', we wouldn't be able to deliver upon it (M1)

There is never enough funding, but at the same time, we know there is a skills gap (E1)

Furthermore, a politician noted a rather fundamental knowledge gap regarding a lack of detailed awareness of LTN 1/20. An engineer thought local authorities needed to review the skills of personnel available for cycle infrastructure design.

It is amazing how many people who haven't read the book work on these things (P2)

Local authorities need to look at who is sitting in their office... whether they have the skills to deliver this sort of infrastructure (E4)

#### 4.6 Stakeholder engagement

There was some concern expressed by a politician about the knowledge of users in relation to the design quality of cycle infrastructure. This was supported by a view from a manager.

Stakeholders say one thing and ask for another. They say they want LTN 1/20 but... many are attached to trees and green space... they don't want bound surfaces 4-5 metres wide (P2)

The change in guidance hasn't been brought along with stakeholders' opinions (M2)

There could be an issue about the level of engagement of users in scheme development and their understanding of their aims, objectives and constraints of a scheme.

We need more community engagement to win hearts and minds and explain to people what we are trying to achieve (P1)

### 5. Discussion

It is encouraging that at least one politician considered it possible to increase cycle trips, and this was coupled with a recognition among users that such an increase in trip making would require quality infrastructure separated from both motor traffic and pedestrians. Equally, it is noteworthy that there is a

recognition of a need to constrain the use of the car, and this suggests some development in thinking beyond the position outlined by Plyushteva and Barnfield (2020). This will both (a) create better conditions for cycling and (b) make people more biased to cycling because it will become relatively easier compared with using a car.

There were some mixed findings in relation to ambition. One politician noted a difference in relation to the views between central government and local government on the degree of ambition needed for cycle infrastructure schemes. The level of ambition implicit in LTN 1/20 was, however, welcomed by an engineer.

There were many concerns expressed in relation to the level and timing of funding. Relative to the scale of the task, it was suggested that the funding is coming in tranches that are too small and this limits the quantum and quality of infrastructure that can be delivered. Equally, the methodology for funding requires a local authority to know the type and extent of a scheme before it bids for funding. However, as time progresses, a forward workload of cycleway construction schemes is likely to begin to be shaped by local authorities in anticipation of future funding.

There were also concerns expressed that if the schemes are deemed not to be compliant by the inspectorate, then future funding may be jeopardised, and this may have an impact on the type and scale of schemes proposed in early rounds of funding. It should be noted that the competitive funding regime, coupled with inspection, is a rather different approach than the collaborative agreements for large tranches of funding in the Netherlands (Lagendijk and Ploegmakers, 2022).

There were many comments made in relation to the level of compliance with the guidance in LTN 1/20, with comparisons made with the DMRB approach, which is a standard rather than guidance. There appears to be a good deal of uncertainty around the flexibility and latitude designers may have in relation to complying with the guidance, especially in locations where there are constraints. One point made was that short sub-standard route lengths may be acceptable to riders and it is better to create a network with relaxations from the guidance rather than not build anything. This is in line with the finding of Lagendijk and Ploegmakers (2022) that technical advice is a relevant area of concern.

Some concerns were raised about the challenges of retrofitting cycle schemes into highways and the suggestion was that longer funding streams with larger grants may allow more ambition, which could include, for example, the lengthy processes of further land acquisition.

There were some issues expressed in relation to LTN 1/20 primarily being focussed on urban areas and the challenges



of constructing routes in rural areas. Motor traffic speeds are generally higher in rural areas and this suggests a greater degree of separation is required for cycle traffic, adding to cost.

All participants knew and understood the need to separate pedestrians from cycle traffic, which is encouraging. Some important insights were made in relation to the criteria for separation from motor traffic. This includes criticism of table 4.1 in LTN 1/20 for not emphasising different vehicle mixes. Similar to the point about the extent of relaxation, it was noted that cycling for longer distances in any level of motor traffic at 30 mph (48 km/h) may be uncomfortable and unattractive even for those willing to cycle short distances.

The guidance was also criticised in relation to the suggestion that traffic-calmed 'quiet lanes' need to have unobtrusive signs, but the counter suggestion is that these are a required mechanism for slowing traffic. There was also a suggestion that the guidance ought to provide much enhanced detail on how to assess the impact of cycle facilities on flows at junctions.

There were some serious concerns expressed about the availability of suitably qualified staff to design cycle infrastructure. A politician critiqued designers who do not appear to have read the guidance and an engineer suggested that local authorities need to carefully consider their staffing in relation to cycle infrastructure design. This all points to the validity of the actions taken by the JBM in relation to the educational base of engineers (JBM, 2022a). Even though the funding is still regarded as modest, there are insufficiently qualified staff to design and deliver cycle infrastructure projects.

## 6. Conclusion

This paper has provided a qualitative exploration of the issues around the applicability of LTN 1/20 (DfT, 2020a) within the context of Active Travel Fund grants provided by central government to a rural highway authority. To investigate the issues, 13 semi-structured interviews were undertaken with politicians, managers, engineers and cycle users.

The results suggest a desire to implement appropriate infrastructure for cycle traffic, with the recognition that there are challenges. These challenges are around the methodology of the funding, which, after a bidding process, arrives in relatively small amounts; this may preclude the development of larger and more ambitious schemes.

There are concerns around the exact requirements of LTN 1/20, which is guidance rather than a standard. Compliance should be assisted by the inspectorate function of Active Travel England; however, as much as being a guide and a helper, there were concerns about the consequences of failing to meet the inspectorate's requirements in relation to LTN 1/20.

It is encouraging that the participants were aware of the need to separate cycle traffic both from motor traffic and pedestrians. Significant concerns were raised in relation to the availability of suitably qualified staff to design cycle infrastructure.

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