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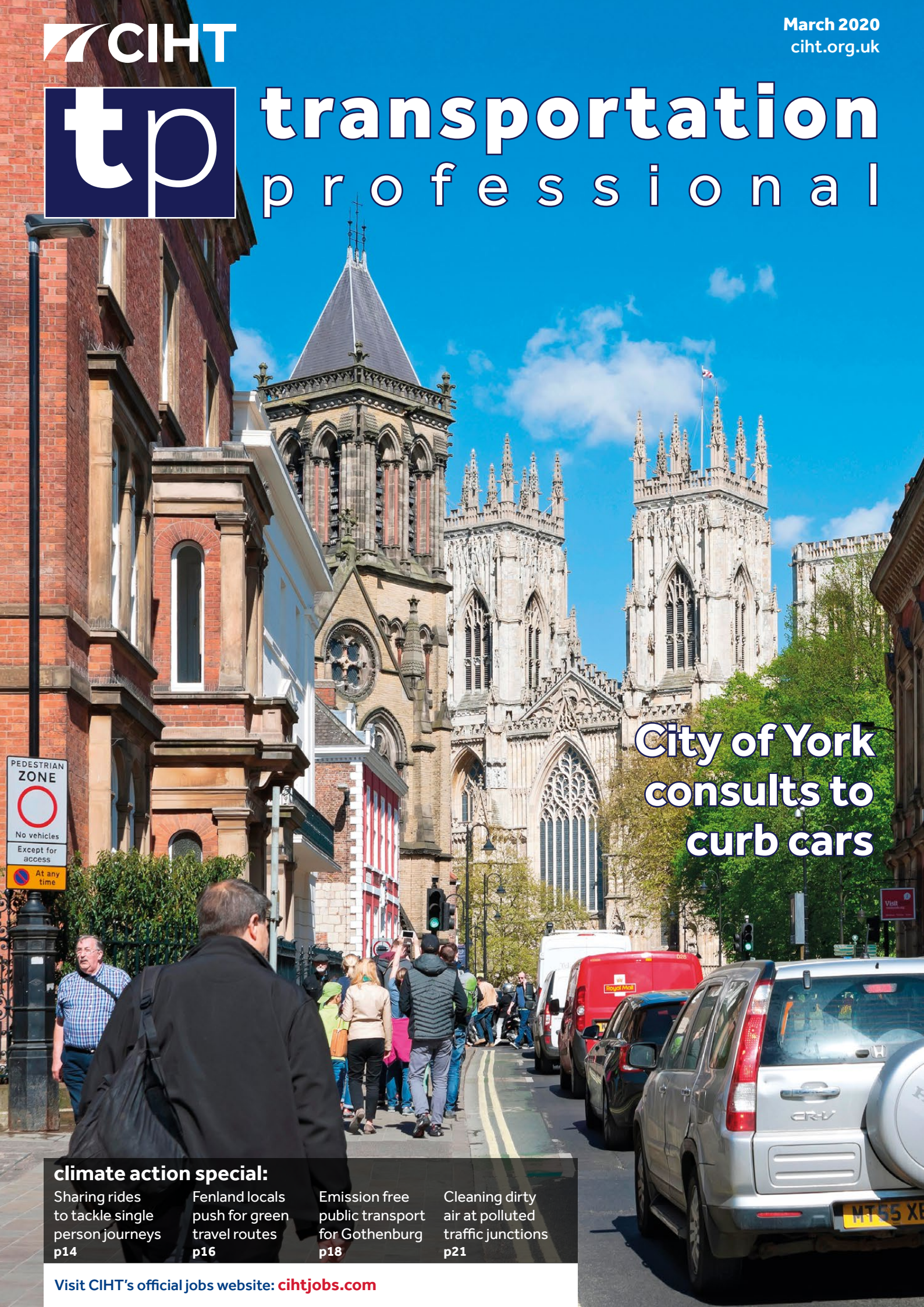

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This issue's cover: *Traffic builds on the approach to York Minster. The city is consulting with local people over how best to reduce private vehicle movements (see page 12).*
COVER IMAGE: PURPLE MARBLES YORK 1 – ALAMY

Maintenance focus called for to manage

Government is urged to increase support for flood prevention and ensure roads and bridges are better protected from heavy weather in the forthcoming Budget.

Commentators emphasise the need for a renewed focus on delivering routine maintenance to drainage systems throughout the country after storms Ciara and Dennis caused widespread disruption across the UK last month.

Heavy rainfall resulted in road closures and communities were flooded, and several railway lines were shut due to standing water and landslips.

The Environment Agency says it is spending £2.6Bn building new flood defences and £1Bn to maintain existing defences in England. The programme will better protect 300,000 properties by 2021 in addition to around 9600km of motorways and local roads and 480km of railways.

"The best way to defuse the 'weather bomb' is better protection and stronger resilience," said the Agency's chief executive Sir James Bevan.

↑ Innes Thomson

He added that development on flood plains should only happen if there is no feasible alternative, but it cannot realistically be banned. Greater resilience "also means designing new places, buildings and infrastructure so that they are built to cope with flooding".

Environment Secretary George Eustice told the House of Commons that 343 flood warnings were issued for Storm Ciara and 514 for Dennis. Government "acted swiftly" to activate the 'Bellwin scheme' to help local authorities cope with the cost of response and triggered a flood recovery framework to aid local communities, he said.

← Shrewsbury on the River Severn was a flooding hotspot MRMHF – SHUTTERSTOCK

Shadow Environment Secretary Luke Pollard urged Government to stop house building on vulnerable floodplains and the MP for Rhondda Chris Bryant called for more money for maintenance.

His local authority faces a bill of more than £30M "just to put the culverts right, to dredge the rivers and to sort out the bridges", he said.

Association of Drainage Authorities chief executive Innes Thomson told *TP* that "a lot of our road side drainage is in a terrible state. There is often no regular management and maintenance of gullies".

He emphasised that blocked drainage systems cause flooding which damages road surfaces. "Most highway engineers would not have chosen to ignore routine gully maintenance; they have been led by financial pressures," Innes added.

Ahead of this month's Budget, he called on Government to provide more funds to support those carrying out routine maintenance to watercourses, gullies and highways.

He also urged investment in a wide range of solutions to manage flood risk across river catchments and said collaboration between different authorities is key. "We need to highlight where this is working and replicate it elsewhere."

Oxfordshire County Council's director for growth and economy Owen Jenkins agreed that "through austerity a lot of maintenance work has fallen by the wayside", and said many landowners are failing to clear drainage ditches.

He also noted that the long term impact of recent events on bridges due to increased river scour is yet to be seen.

"We are going to see bad weather more often which means we need to be planning for it," he said, and called for authorities and agencies to work together across county

Pothole crisis deepens following major storms

↑ Wet weather can cause highway failures A LLOYD

Intense rainfall seen in recent weeks creates a heightened risk of structural highway failures and throws a spotlight on the need for more road maintenance funding.

Asphalt Industry Alliance chairman Rick Green said the impact of flooding is "particularly acute on poorly maintained, less resilient parts of the network where water can penetrate existing cracks or defects, leading to the formation of potholes and, in time, undermine the entire structure of the road".

He added that a well maintained, resilient network "would be better able to deal with wetter winters and increased volumes and weight of traffic", and renewed a call for an additional £1.5Bn per year to go to local authorities for highway maintenance over the next decade.

The Alliance's ALARM road maintenance survey found last year that 55% of English authorities had to deal with unforeseen events, such as flooding. "Respondents tell us that, ideally, around 12% of highways budgets should be allocated to reactive maintenance, but figures in recent years are closer to 20%," said Rick.

Consultant WSP's head of profession for local government Matthew Lugg FCIHT agreed that the recent floods further illustrate the need for more money to go into highway maintenance.

flood risk

boundaries and take a "more holistic view of whole river catchments" when planning flood management.

Former member of the Committee on Climate Change's adaptation group Jim Hall of the University of Oxford also agreed that dealing with blocked drains is a "perennial issue" and said the Government will have to ask itself how flooding ranks as a priority alongside other issues.

↑ Jim Hall

He said investment in flood defences is beneficial, but added: "I would be looking at a steady ramping up of expenditure; it is not efficient to throw a load of money at a problem and expect to fix it overnight, we need to take a long term view."

Local Government Association's environment spokesman David Renard said funding for flood defences needs to be devolved to local areas to ensure money is "directed towards projects that best reflect local needs, which includes protecting key roads and bridges". **SD/MW**

↑ Railway damage in Wales NETWORK RAIL

He also paid tribute to the local authority staff and contractors who "have worked tirelessly following the multiple storms and on going flooding, doing their best to keep roads open".

Matthew added that transport users must be kept well informed about diversionary routes set up following a flood. "I got stuck in a market town where every major route was flooded and there was no information about which way to go."

He suggested that some flood affected routes could be better signed using variable message boards giving the latest information.

● CIHT's Improving Local Highways review sets out recommendations to address highway condition. To view the report visit *ciht.org.uk/ilh*

← Improved delivery is needed on major schemes CROSSRAIL

Devolved funding urged to pay for infrastructure

Greater consensus needs to be built over the country's long term objectives for infrastructure investment and Whitehall should relinquish further decision making powers to the regions, policy specialists say.

National Infrastructure Commissioner Bridget Rosewell urged more agreement on "the big projects over which we have been arguing and debating for so long", hinting that schemes like Crossrail and High Speed 2 take too long to get spades in the ground.

She welcomed that sub national transport bodies are now developing their own programmes through a 'bottom up' process, which she suggested makes it more difficult for Government to "say no" to schemes.

But, Bridget warned: "One of the things we do is spend years and years trying to get the best possible solution to a particular problem, by which time it is out of date. Trying to stop 'the best' being the enemy of 'the good' is one of my own personal mantras."

She was speaking as part of a panel discussion hosted by the Institute for Government, which took place before Chancellor of the Exchequer Rishi Sunak is expected to unveil a National Infrastructure Strategy at the Budget on 11 March.

Government needs to set its recent infrastructure funding pledges within a cohesive long term plan, the National Infrastructure Commission urged in its latest Annual Monitoring Report published at the end of last month.

And a recent Institute for Government document warned that Boris Johnson's administration will need "realistic expectations about the time and cost it will take to complete projects and appropriately qualified staff within departments" to deliver on its promises.

Also speaking at the event, Confederation of British Industry infrastructure director Tom Thackray called for moves towards greater devolution, "particularly of transport spending".

"The rules of the game around that devolution need to be made clear," he emphasised. "At the moment it seems to be done in fits and starts and no area is particularly sure about what it needs to do to get its hands on spending or decision making powers."

Improving project delivery must also be a priority, he added, and said investment is required in developing commercial, procurement and contract management skills across the public and private sectors.

↑ Bridget Rosewell

Meanwhile a new report produced by Arup alongside the London Transport Museum urges new approaches to pay for future transport infrastructure developments. A central vision for sustained Government funding is essential, it says, but additional funding and finance opportunities at metro and city level must be explored.

These could include greater focus on land and property value capture, handing city authorities the fiscal powers to borrow and retain some of the taxes generated from their transport investment and embracing road user charging.

Arup chief economist Alexander Jan said: "Over the years, centralisation of local government finance has emasculated city halls across the land.

"Despite some welcome progress, further rounds of fiscal devolution are needed urgently to reconnect transport investment and local economic growth."

Highland city canal bridge to swing in

↑ An aerial view of the site in Inverness, where a section of canal has been drained HIGHLAND COUNCIL

Construction of a second swing bridge over the Caledonian Canal forms a key part of the final stage of the £55M 'West Link' project in Inverness, where preparations are under way for the new structure to arrive on site this summer.

The canal has been drained to allow installation of the cofferdams at the extents of the bridge and a new wharf, while piling for the bridge's east and west abutments have been progressing since the New Year. The canal is expected to reopen this month.

Piling works were delayed in December due to unfavourable ground conditions but an extra rig was brought in and operatives worked over Christmas to keep the project on schedule.

A new road link is being built from the bridge to a new roundabout on the A82, and road surfacing for the realigned General Booth Road – which also ties into the roundabout – is now complete.

The works are being carried out by contractor RJ McLeod for the Highland Council.

Once complete at the end of this year, the new swing bridge will work in tandem with the existing Tomnahurich swing bridge to reduce delays for vehicles travelling over the canal, while boats pass through one or other of the structures.

Operation of the bridges will be managed from a new control building.

Highland Council leader Margaret Davidson said: "The second swing bridge will be an enormous bonus to keep the traffic flowing on the A82, especially with an ageing Tomnahurich Bridge."

The project complements phase one works which completed in 2017 and saw creation of a new road link from the town's southern distributor at Dores Road and the A82, including a crossing of the River Ness.

HIGHWAYS ENGLAND

Norfolk dualling: Political and business stakeholders have repeated calls to dual all 185km of the A47 across East Anglia, as Highways England consults on plans to upgrade an 8km stretch of the route. Views are invited on proposals to deliver dual carriageway between North Tuddenham and Easton, west of Norwich, which is set to begin construction in 2022.

The scheme is one of six currently planned improvements to the A47, collectively worth £300M. However pressure is mounting to go further and upgrade the entire route from Peterborough to Lowestoft.

"The full dualling of the A47 is a 'must have' in order to deliver greater economic growth and jobs in this region," said Norfolk Chambers of Commerce head of policy Nova Fairbank. The chamber is a member of the 'A47 Alliance' campaign group which also includes local authorities.

"At present just 47% of this major route is dualled," she said, adding that to date work has not started at any of the six planned improvement sites.

Highways England's programme lead for the A47 Peter Havlicek said upgrading key sections of the road will boost economic growth and keep the region connected.

Contracts

AECOM will undertake a study to assess options for a new active travel bridge crossing the River Deveron between Banff and Macduff in Aberdeenshire.

Balfour Beatty will carry out refurbishment and repainting on the North Queensferry approach span to Scotland's Forth Bridge for Network Rail.

Highways England has been given development consent to allow work on the 14km A30 Chiverton to Carland Cross dualling in Cornwall.

John Sisk & Son has started work on a £78M upgrade of the M6 junction 10 near Walsall to increase capacity and replace overbridges.

Kier has been appointed to manage a 15 month interim highways services contract for Birmingham, covering traffic operations, maintenance and winter servicing.

CIHT 100

Do you welcome efforts to introduce deliveries by drones in towns and cities?

YES 54% Drones will lead to a reduction in the number of delivery vehicles on the roads, cutting congestion and helping to decarbonise logistics operations.

NO 46% They would be a logistical and safety nightmare. Also, how would a drone deliver a book through a letterbox or a pizza through my front door?

To join the CIHT *100* panel please email *mike@transportation-mag.com*
This question can be responded to at *ciht.org.uk* Also, see page 8.

New digital tool promises better navigation for people with sight loss

Innovative wayfinding technology designed to help blind and partially sighted people navigate and better understand their surroundings is about to launch in the UK, promising to help those with accessibility needs use public transport.

A smartphone app developed by Spanish technology company NaviLens is currently being trialled inside the Euston office of the Royal National Institute of Blind People (RNIB), and this spring is set to be trialled at Heathrow Airport Terminal 4.

The app works like this: the camera on the user's smart device scans the environment for specially developed optical 'markers', which contain useful information. The app relays the information audibly or in text form for the benefit of people living with sight loss. Or, through the 'Navilens Go' app, information can be displayed visually on the screen as graphical detail or using augmented reality.

The markers resemble a multi coloured 'QR Code' and represent an evolution of the technology in that multiple markers can be detected at much greater distances, within a 160° field of view. Information held by codes could range from up to date departure times, to navigational advice such as pointing the way to different platforms on the station.

↑ Technology in use at a bus stop in Barcelona TMB

← John Worsfold (right) and Marc Powell of RNIB beside a travel information sign featuring a NaviLens marker (also below)

The RNIB's innovation and technology implementation manager John Worsfold is excited by the development. "This solution is as intuitive as contactless payments. It removes the barrier that blind and partially sighted people face in getting information."

The markers – which can be placed on the floor, walls, doors or specific objects – also allow multi directional information to be given depending on where they are scanned from, meaning people are always given accurate wayfinding guidance.

Information is automatically translated to the user's native language. The distance to the detected marker is also conveyed audibly, making it easier to locate points of interest such as entrances and exits. The app also includes a 'filter' function allowing users to specify what information they are interested in detecting.

"I think this technology is going to be groundbreaking going forwards," John added.

NaviLens is already in use on Barcelona's public transit network, and it was tested by the Los Angeles Metro at Union Station. Its forthcoming trial at Heathrow is an important step forward. "An airport environment is complex, especially for somebody living with sight loss to negotiate."

He explained that many people living with sight loss experience additional challenges associated with public transport. RNIB research shows 48% feel 'completely' or 'moderately' cut off from people and things around them. "We need to change that," he said.

Common challenges include lack of awareness by staff, independently navigating and accessing points of interest such as departure boards and entrances and exits, and inconsistencies with tactile paving. Unfamiliar journeys can be particularly hard to navigate.

"Fundamentally the infrastructure needs to be accessible," John emphasised, "but technology can help bridge the gap".

"By getting it right for those in society with a greater need, such as blind and partially sighted people, you tend to get it right for others as well," he added. "Services should be fit for everyone, rather than needing to make any special provision. That's what we strive for." **SD**

Issues around vision require greater awareness

Lack of understanding about the broad spectrum of eye conditions covered by the term 'blind and partially sighted' can lead to individuals' needs not being met by those attempting to make services accessible, according to the Royal National Institute of Blind People.

There are an estimated two million people in the UK living with sight loss. But just 7% are considered totally blind and only 10% read Braille.

"Everyone's condition is different and the way people live with their condition can be at complete polar opposites," said the institute's innovation and technology implementation manager John Worsfold. "I don't think that society, transport operators and policy makers necessarily get that."

This can often lead to accessibility issues being supported in the wrong way, he added. "When instinctively transport providers and others put Braille on the sign to the toilet, 90% won't be able to read that."

RNIB has created a campaign called 'See Differently' which seeks to educate stakeholders on the needs of people living with sight loss and the broad spectrum of conditions that make up this group.

As part of this a virtual reality app was developed for the Google Cardboard device – known as 'Eyeware' – which allows stakeholders to experience what it feels like to have various eye conditions. "This helps to bring it to life for people so they understand."

He also emphasised the importance of building in accessibility from the outset when it comes to transport infrastructure and services. "You can't retrofit inclusivity, you have to build it in right from the source."

Do you welcome efforts to introduce deliveries by drones in towns and cities?

Yes

Holly Jamieson
Head of Future Cities
Nesta Challenges

Drone technology is already very well advanced. These devices can carry out a plethora of useful tasks, often saving time and money, reducing pollution and freeing up our congested road and rail systems.

However, deploying drones at scale in complex urban environments is still a long way off.

At Nesta Challenges, through our Flying High programme, we have partnered with cities to explore the potential benefits that drones could bring as well as the risks.

New technologies always stir emotions, but despite concerns over safety and privacy we found cities were supportive of drone use where there was a very clear public benefit – for example with the deliveries of medical supplies.

From medical equipment to pathology samples or even organs, drones could be making urgent deliveries between hospitals, dropping supplies to the scene of accidents, or transporting drugs and devices between pharmacies and care homes.

The consultant Price Waterhouse Coopers says drones represent a £42Bn GDP opportunity by 2030, much of which would be realised in cities, and that drones could save the public sector £1.1Bn by 2035.

So while commercial drone deliveries may still be a long way off, drone deliveries supporting public services in cities could be part of our reality in the near future, bringing major benefits for the public sector.

This is a great opportunity for cities, but the public will be critical in enabling the development of these urban drone services.

If we can integrate technology, regulation, city leadership, public services and public engagement, we will help position the UK as a global leader in developing urban drone services and will unlock significant economic opportunity for our future.

No

Natalie Chapman
Head of urban policy
Freight Transport Association

In our view, drones only serve to be a niche solution to last mile deliveries.

The logistics sector is committed to servicing its customer base in the most efficient, safe and cleanest way possible; something that cannot be accomplished through the use of delivery drones alone.

Drones are not capable of significantly reducing the number of delivery vehicles on the UK's roads; it is simply not possible for the thousands of tonnes of goods that must be delivered daily into an urban area to be done so via drones.

We need a solution that is scaleable, as not all last mile deliveries are small parcels.

Think of the barrels of beer to pubs, supermarket deliveries and the sheer volume of clothing that goes into Primark on Oxford Street every day.

The National Infrastructure Commission's Freight Study published last year backs up this view.

It stated that transporting goods by HGV or van 'is still the most efficient way of moving goods when vehicles are optimally loaded'.

The study also pointed out that vans are particularly efficient in urban areas 'when it is more difficult to use vehicles which have a higher payload, but are far less manoeuvrable'.

The Commission went on to say that none of the current or emerging alternative delivery vehicles for the last mile – such as electric cargo bikes, droids or drones – have payloads equivalent to a standard van.

'It is therefore clear', the study added, 'that vans and HGVs will continue to have the dominant role in freight in urban areas'.

So instead of getting distracted by the idea of thousands of drones buzzing above our heads, our focus should be back on the ground.

We need to place our attention on how the logistics industry can operate the fewest, safest, cleanest HGVs and vans and – where possible – to deliver outside of peak traffic hours.

Yalena Coleman

Job title – Head of data and demonstrators, Connected Places Catapult

Terms of reference – I work across our data science and urban technology teams, looking at methods for applying new and emerging technologies in the advanced urban services and intelligent mobility sectors.

Suitability for the job – I've worked with technology my whole career, but in the last five years have been focused on the application of technology for urban issues such as transport and mobility, healthy ageing, the built environment and air quality.

Where based – Clerkenwell, London

Transport to work – Cycle

Top of in-tray – Setting up various testbeds for businesses to try new services.

Best aspect of job – It is very rewarding to work on complex projects that aim to improve life in our ever more crowded urban environments.

Worst aspect – It can be slow and frustrating to try and change behaviours towards walking, riding and cycling. People are way too attached to their cars. That mindset needs to change.

What is the most important transport issue today? Lack of capacity on our transport networks in urban areas. Our current modes of vehicle transport (freight and personal) are no longer sustainable. We need viable alternatives and for commercial purposes have to take a hard look at alternative last mile delivery methods and consolidation.

How do you relax? Yoga and spending time outside.

What advice would you give to your younger self? Take more risks and expand your comfort zone. Travel a lot to gain perspective on life and be as involved in your community as possible.

Ambition – To continue to help tackle interlinked urban challenges: transport, energy and air quality are all part of a system which needs constant review and evolution to survive and thrive.

The Highway Engineer was the first journal of the Institution of Highway Engineers. It was followed in later years by Highways & Transportation magazine and Transportation Professional. Here are extracts of stories published in the journals 10, 25, 50 and 75 years ago.

10 years ago

Award of a Royal Charter has transformed at a stroke the status of the former Institution of Highways & Transportation. Now known as the Chartered Institution of Highways & Transportation – or CIHT – our learned society of 12,000 members has been recognised as being of increasing national and international significance.

The award follows a petition to the Privy Council for a Royal Charter and the subsequent consent of the Sovereign. It puts the Institution on the same level as other major chartered bodies in terms of formal status and of governance. *(CIHT will be celebrating 10 years of the Royal Charter through a series of initiatives this year).*

25 years ago

Transport growth in recent decades has been road based, wrote the Welsh Office Highways Directorate's head of roads construction Brian Hawker. In South Wales there is a significant programme of trunk road improvements and completion of the Second Severn Crossing is widely awaited.

However many people are concerned at the rate of traffic growth and the Government is considering measures which will reduce such growth and improve the competitiveness of public transport. There is a need to expand on existing measures including pedestrianisation, traffic calming and better integration of parking and public transport.

50 years ago

Traffic engineers are in most cases inadequately equipped by training to cope with the many demands of public relations, wrote RH Pitts of Cornwall County Council. Greater efforts must be devoted to training for this aspect of their work. Not only can more emphasis be placed on these subjects in the examination syllabuses, but time could be well spent on activities such as mock public inquiries and meetings.

The employing authorities should ensure that trainees and junior assistants attend meetings and inquiries to gain skills and experience and are given opportunities to express themselves in public.

75 years ago

Careless pedestrians, reckless drivers and defective vehicles are not the only causes of road accidents, wrote Watson Garbutt. There are also those which have allegedly been caused by the road condition.

These include incidents due to smooth road surfaces, bad side slip cambers, uneven or corrugated surfacings and blind corners or bends. But it is very easy for blame to be laid on road defects when accidents have been otherwise caused, and therefore the local chiefs of police could take greater advantage of the private and unbiased technical assistance of highway engineers on points of doubt.

Shared city travel

As major cities grapple with the concept of letting autonomous vehicles loose on their streets, the findings of one European academic revealed the other week offer a fresh perspective.

Michal Čáp, a research associate in artificial intelligence at the Czech Technical University, told a meeting in London that on demand driverless cars – that can be shared by groups of strangers – could reduce the number of vehicles driven through a city by a factor of 10.

In a recent computer simulation focused on Prague it was found that the 122,000 private vehicles currently in use could be slimmed in number to 33,000 if all of them were available for shared use and occupied by one person. Fill each driverless car with five people and the number of vehicles needed falls to 13,000.

One consequence of using these shared vehicles more intensively is that the overall number of miles driven will rise: for Prague it is thought the increase will be more than a third. It was also pointed out that because urban transportation patterns are unbalanced – with many more people travelling in to cities in the morning than out – empty vehicles will need to be sent in the opposite direction.

But concerns over air quality would presumably be addressed if the shared vehicles are zero emission, and extra congestion may be avoided if fleets of connected cars could travel closer together in convoy. The focus of the presentation was not about promoting the benefits of autonomous vehicles per se; rather that their shared use could make city streets run more freely.

Not everyone was convinced by the shared vision, however. "This is all a fantasy," exclaimed one audience member. "Some people are not going to want to travel in these horrible little pods."

But for those less averse to the idea of shared, autonomous driving one key question still hung over the room: how do we motivate people to ride share?

"The answer may be some sort of clever congestion pricing," Michal replied, "where you pay for every second and square metre that you occupy on the private road. If you share a vehicle, the cost is distributed meaning it will be expensive to drive alone and more affordable to use a high occupancy vehicle."

Some people will say that the concepts of shared mobility and autonomous vehicles naturally go hand in hand; whereas others may feel that the driverless element is still too far into the future to be considered seriously.

For the moment at least, the idea of people sharing private vehicles to cut the costs of motoring while reducing emissions too does seem to be gaining some traction. Our feature on pages 14 and 15 including an interview with shared mobility champion CoMoUK and the experiences of others involved in car sharing and shared rides provides an interesting insight into this growing trend.

But for me – leaving the meeting in west London and travelling back to Charing Cross – I considered how far we have already come regarding shared transport. This summer is 10 years since the capital launched its cycle hire scheme and I can think of no better way to travel from one side of Hyde Park to the other: under my own steam, at very little expense and with zero emissions. Shared autonomous travel may be coming, but shared active travel is here now.

Stop press

Climate campaigners won their case to block Heathrow expansion just as *TP* went to print. It will be interesting to see what impact the Court of Appeal's ruling may have on other major projects in future, not just those in aviation. Environmental concern is most definitely the defining issue of our time.

Mike Walter, Editor

Transportation Professional welcomes letters from readers on all subjects raised by the magazine and about any other transportation issue. Please keep your letters brief and include your CIHT designation, if applicable. The Editor reserves the right to condense. Address your letters to: **mike@transportation-mag.com** or write to: The Editor, Transportation Professional, 7 Linden Close, Tunbridge Wells, Kent TN4 8HH or use Twitter: @CIHTUK

Making predictions is getting difficult

Two items in February's issue caught my interest. The first was the on going 'green waves' discussion to improve traffic flow and the second was the piece about the A77 Maybole Bypass which referred to reusing material "to achieve a cut/fill balance".

I began my career in transport planning in the 1960s. At that time the principal guidance on traffic management was contained in 'Urban Traffic Engineering Techniques' published by the Ministry of Transport in 1965. On page 67 it says one method of linking traffic signals is "sometimes called the green wave system". So nothing new there.

As for achieving a balance between cut and fill, this was an intrinsic aspect of highway engineering I was taught at university in the 1960s.

What has changed in the last 50 years is the confidence behind predictions of future demand for movement. In 1970, I was fairly confident in using transport models to forecast the situation 10 and 20 years hence.

In 1980, I was even more confident as modelling had become more sophisticated. By the 1990s predictions that my team and I were making for the period 2000 to 2010 turned out to be fairly accurate.

However in recent years it is becoming more difficult to make predictions with any confidence because of changes in communications technology, environmental concerns and public attitudes.

← Predicting travel demand is not easy

STEVED_NP3 – SHUTTERSTOCK

The Government's decision to proceed with High Speed 2 is a case in point. It is entirely focused on travel to and from London. With the first phase not due for completion until 2030 and later stages taking until 2040 or beyond, will increasing numbers of business people still be wanting to travel to and from London with the need to change modes on arrival to get where they actually want to go?

Will they instead be much more likely to seek travel from door to door in driverless cars? Will High Speed 2 turn out to be mainly used by those making optional (leisure) trips who are less worried about saving 30 minutes, especially if this costs more than the alternative?

I do not (yet) know the answers but we urgently need to start thinking and planning along less conventional lines before we commit ourselves to the creation of multi billion pound fixed and inflexible infrastructure.

Ian Lawson FCIHT
Buchanan Street, Glasgow

Near misses and smart motorways

Following your article on smart motorways (*TP* February, p7) I would like to address the issue of near misses and the number of those recorded.

Your report does not make it clear that near misses are proactively reported by Highways England and that none of the 1485 incidents recorded on the M25 between junctions 23 and 27 since April 2014 resulted in any injuries.

↑ Smart motorway safety remains a talking point

HIGHWAYS ENGLAND

We describe a near miss as 'an event not causing harm, but has the potential to cause injury or ill health'. This definition is different to how the term 'near miss' may be more widely understood.

A near miss does not necessarily mean a situation where vehicles narrowly avoided each other, but could include road users driving into coned off areas.

The Department for Transport has considered a range of evidence during its recent review of smart motorways. We are committed to implementing any new recommendations as part of our on going work to make our roads even safer.

Diane Davies
Highways England
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Wider carriageways are generally safer

I share Alan Hames' concern with certain forms of smart motorway currently in use or under construction in England (Letters, January issue) and feel that wider carriageways are generally safer.

It is worth bearing in mind the fundamental problem is our demand for travel ease. Budgets are constrained – they might have been better expended on a suitable railway system – and compromises have to be made. I personally cannot see the roads authority being allowed to construct new hard shoulders.

Ultimately we may have to depend for our safety on the tranche of new vehicle technologies which are mandated for introduction to new vehicles from 2022 and which – according to an earlier article in *TP* – will remove the need for road signage by 2027.

Andrew Fraser MCIHT
27 Argyll Avenue, Stirling

Definitive scheme guidance needed

Back in the not too distant past, transportation engineers could rely on Government produced guidance when planning and developing schemes.

Everyone knew they could refer to a Traffic Advisory Leaflet or Local Transport Note for best practice.

We have a plethora of guidance in certain fields but I sense that the sources of guidance have become more diverse. Some excellent guidance has been produced in recent years but I fear it is not as well disseminated as it used to be.

Not only do we risk losing knowledge and having to reinvent the wheel but we seem to be lacking definitive guidance in some key emerging areas. Take electric vehicle charging points as an example.

There is a range of guidance from sources as diverse as Transport for London and the Orkney Renewable Energy Forum, but there does not seem to be a definitive national guidance document. Perhaps other readers can put me right on this.

Is it time for the Government to take up the mantle and produce and actively disseminate definitive guidance again?

Kevin Hamilton MCIHT
Head of roads, Glasgow City Council
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Freight and buses suffer delays too

In response to Phil Parker (Letters, February), freight traffic and buses are also delayed by peak hour queueing, not just car drivers.

Businesses experience substantial costs from delayed and uncertain deliveries. Bus users need a reliable and frequent service if modal change is to succeed.

Walkers, of course, especially the young and the elderly are discouraged by poorly maintained footways and inadequate night time lighting. Cyclists want routes where they are not at risk from goods vehicles, or having to dodge potholes.

Government wants more houses, but developers will only pay for new infrastructure which is necessary to enable them to get planning approval. They are not public benefactors but are entitled to a profit on their investments, and therefore will want their estates to look and feel attractive.

That means public money must be found to provide freight routes which do not affect people going about their daily business, or the places where they live. However public money for local authorities is in short supply. There has to be a way out of this somehow.

John Oliver FCIHT
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VICTORIA AND ALBERT MUSEUM, LONDON

↑ Some of the iconic vehicles currently on display inside the Victoria & Albert Museum

Cars and style combine at new show

Fashion and product design are staple themes of many exhibits inside the Victoria & Albert Museum, so it was a surprise to hear that motor vehicles are being celebrated in a new show within the grand old building in South Kensington.

But after a thoroughly enjoyable hour ambling around 'Cars: Accelerating the Modern World' the extent to which vehicles have helped shape and been informed by the cultural zeitgeist became clear.

Because there are not just many fantastic examples of cars on show from the last 130 years inside the exhibition. Several displays also feature beautifully designed and colourful household products from down the years such as a Wassily chair, Brownie cameras and Corona typewriters.

The inclusion of such items, it was explained, was to show how the aesthetic of cars – such as streamlined design – has made its way into the look of everyday objects. And both cars and household items carry an element of 'styling obsolescence' where an object's appearance is periodically updated to encourage consumers to want the latest model.

Also on show is a huge robotic arm used to manufacture vehicles at the General Motors plant in New Jersey, and film footage of music group Martha and the Vandellas singing 'Nowhere to Run' in a Detroit vehicle plant, where the founder of Motown Records used to work.

Beautiful paintings, sketches and magazine covers from down the years depicting how people may travel in the future also feature, alongside bound Michelin guides and several road maps from nearly a century ago.

But there is also a disturbing advert on display from the Humble oil company featuring a photograph of a glacier, alongside a boast that the firm supplies enough energy every day to melt seven million tonnes of glacial water.

Oddest of all, however, was to come across Graham, a semi nude lifesize model of a human featuring an enlarged skull, tiny ears and nose and a chest with an exaggerated ribcage. The sitting figure was designed by an Australian artist to show what a person may look like if they had evolved to withstand the impact of a car crash.

The show also features four items from the archives of technology company Bosch: a headlight from 1913, electric horn from 1921, a windshield with wider blade produced in 1926 and an antilock braking system introduced in 1978.

But back to the vehicles, where visitors can get up close to the world's first car: the Benz Patent Motorwagon Number 3. Despite a top speed of just 10mph the vehicle is credited with introducing people to the idea of travelling long distances.

Also on display is a Tatra 77 with distinctive green fin at the back, a Hispano-Suiza whose design is said to be inspired by a boat and a multicoloured, modified Chevrolet 'lowrider' designed for showing off around Los Angeles.

Before visitors leave the exhibition and head through to the gift shop, there is also a nod to future travel: with an autonomous pod in front of a bright visual display and a suggestion of what a flying vehicle might look like, suspended from the ceiling.

The exhibition represents the first time the V&A has hosted a showcase of cars, so why now? "We are at this very interesting stage where the future of mobility is very much up for grabs," explains assistant curator Esme Hawes.

"We wanted to look back at the relatively short 130 year history of the car and remind ourselves of the impact they have had on design, culture and society."

'Cars: Accelerating the Modern World' is on until 19 April. **MW**

Modern thinking in medieval city

↑ Traffic in central York is set to ease under new plans to restrict the movement of private vehicles through the city

York is taking steps to further limit private vehicle access and encourage greater use of cleaner and more sustainable travel to help the city become carbon neutral within a decade. But an outright ban on cars is not certain, reports Mike Walter.

Motorists' ability to drive their cars freely through central York is set to end. Last December the City Council passed a motion to investigate restricting access to private vehicles within its city walls by 2023. This could include preventing access for motorists near schools during drop off and pick up times.

Discussions have begun with residents and businesses to identify the best way forward. One option being considered is to follow the Norwegian capital Oslo's example of closing certain street to cars and removing parking spaces.

"We want to achieve a car free, people friendly city environment."
Andy D'Agorne

↑ Buses play an important role in tackling congestion

Another is to mimic the Belgian city of Ghent which introduced restrictions on through traffic passing from one 'zone' of the city to another (*TP*, February 2018)

The desire to cut down on vehicle movements follows York's declaration of a climate emergency last year. But mention the widely reported 'car ban plan' for York and you will be met with short shrift.

"We don't like the word ban," explains the city council's deputy leader Andy D'Agorne. "We want to achieve a car free, people friendly environment for our city centre, while allowing access where it is needed.

"Oslo, Ghent and other cities have done it and we want to learn from them and develop something which is appropriate. We are working with residents and businesses to get grass roots solutions about how to achieve traffic reduction."

His sentiments are echoed by York City Council's executive member for environment and climate change Paula Widdowson, who says the proposal to restrict private vehicles is about looking to minimise non essential car journeys.

"In an ideal world there would be no cars in the city, but not because of a ban," she says. "It would be because other forms of transport work so well that people voluntarily make the change.

"We want to engage with residents and businesses, rather than say we have all the answers now. We are not going to stamp our feet."

The city has been working for over 30 years to reduce the impact of private vehicles in the centre.

In 1987 a large area of the centre of York was part pedestrianised, with some streets open for deliveries and access only before 10.30am and after 5pm. Other roads are almost completely vehicle free.

For the last 18 months vehicles have been prevented from leaving the city walls through a historic arch on the entrance to Micklegate. And within two years the large open air Castle car park in the centre will close and

Community interests heard by forum

Residents and commuters of York came together last month for the first meeting of a new citizens' transport forum, convened by York Civic Trust's transport advisory group chair Professor Tony May.

It is hoped the citizens' forum will provide local people with a chance to contribute their views towards the city's new local transport plan. The forum brings together around 120 participants out of 500 who expressed an interest in taking part.

Earlier this year a survey published by York Civic Trust along with the city's bus and environment forums found that almost 90% of residents and commuters cited congestion as a problem for the city. Over three quarters said that air pollution and transport's contribution to climate change are serious issues.

↑ Tony May is leading a consultation with residents

Around a quarter of residents and commuters said they expected their car use to increase in the next five years, but only one in eight said they would like to see it increase.

Creation of the citizens' forum is important for local democracy, Tony adds. "If you go and get the public involved you get a much clearer idea of the problems and a richer set of suggestions of what might be done.

"Creating a dialogue between people with different views allows us to try and resolve any conflicts before the plan appears and ideally get a willingness to work with it."

Tony adds that York has a historic road network which is more constrained than most cities and has a core rich with heritage that needs to be protected.

"I have strong feelings that York residents like their city and are supportive of improvements," he adds.

become a park; to be replaced with a multi storey with fewer spaces nearby.

York has six park and ride sites on the periphery; soon to be served almost exclusively by all electric buses. A clean air zone was introduced at the end of January which means buses operating on and within the city's inner ring road more than five times a day have to be either electric or compliant with the latest Euro 6 emissions standard.

For electric vehicle owners, the city plans to open three 'hyperhub' recharging stations at park and ride sites later this year; each featuring more than eight rapid charging points as well as a standard chargers. Paula Widdowson says that strategically located charging hubs could help residents living in terraced streets without off road parking or a charging point to recharge their vehicles more easily. The council has also introduced three electric refuse collection vehicles.

"We want to engage with residents; we are not going to stamp our feet."
Paula Widdowson

In addition York has been stepping up efforts to reduce the number of motorists who sit in their stationary vehicles with their engines left idling, though a campaign called 'Kick the Habit'.

For cyclists the city promotes traffic free riverside cycling, an orbital cycle route around the city and several vehicle free bridges including the Millennium Bridge and an upgraded Scarborough Bridge close to York station.

To help those with mobility needs, the city is exploring the possibility of introducing autonomous vehicles to shuttle between two car parks.

Paula Widdowson is hopeful that people will become less inclined to drive in future, pointing out that social attitudes do change. "We all remember a time when people used to be able to smoke in pubs," she says.

"What we are doing now is preparing the ground for people to voluntarily make the right decisions.

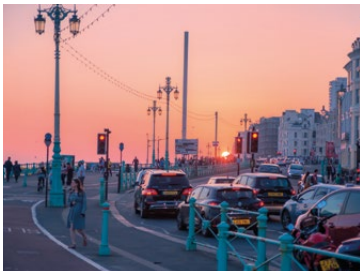
"Rather than sit in your car, stuck in traffic for 40 minutes, we want people to get on a bus, bike or walk."

↑ Several streets in central York are reserved for pedestrians

City car strategies take shape:

Other UK cities exploring options for reducing private vehicle access to encourage greener travel include **Birmingham** (pictured above) which has set out plans to limit cars in the centre and to ban through trips.

A quarter of all car journeys by residents in the city are thought to be less than one mile. Freight consolidation and the use of electric cargo bikes for last mile deliveries are championed in the city's draft transport plan, which also sets out to restrict the availability of parking.



MARIUS_COMANESCU – SHUTTERSTOCK

Elsewhere, **Brighton** (above) could become car free within three years after the local council passed a motion to explore the idea. A report will be considered by October and an ultra low emission zone is planned in the meantime.

Cardiff is considering a £2 daily charge for vehicles driven into the city centre by non residents; and **Oxford** is proposing a zero emission zone, charging £10 for non compliant motorists.

And in the **City of London**, the Beech Street Tunnel (below) under the Barbican estate is expected to see restricted access, allowing only zero emission vehicles as well as walkers and cyclists from this spring.

CLIVE TOTMAN

Opening the door to car sharing

Encouraging shared use of private vehicles to reduce the number of trips could help to tackle carbon emissions from transport, says Steve Dale.

↑ Car clubs have sprung up around the country including in Exeter where 'Co-Cars' runs a service

Single occupancy car journeys are a significant contributor to the climate emergency. Signs point to the need for fundamental changes to vehicle use if the UK is to meet its 2050 target for net zero carbon emissions.

Cars account for over three quarters of vehicle miles in England and this – alongside climate impacts – has implications for air quality and congestion.

But what if people could be encouraged to use cars in a more efficient way by sharing journeys? Could this present an opportunity to break dependency on private car ownership and reduce the number of polluting vehicles on the roads?

"Car sharing will be an essential part of making the transition to more sustainable travel happen, and the potential for growth is huge," says shared mobility champion CoMoUK's deputy director Antonia Roberts.

"Car sharing will be essential to a transition to sustainable travel."
Antonia Roberts

Car sharing initiatives are already in place in several towns and cities and broadly fall into two categories: 'shared cars' and 'shared rides'.

The former includes car clubs, such as those operated by Co-Wheels, Enterprise Car Club and Zipcar. Many operate using a 'back to base' model where users can book a car, collect it from a marked on street bay and return it later on.

A 'one way' model is also becoming available where the car can be parked up anywhere within a defined zone; similar to the way dockless bicycle hire works. One operator – Ubeeqo – runs a hybrid of the two models in London, allocating 'virtual bays' for drivers to park using geofencing technology.

'Peer to peer' car sharing also sits within the shared cars category, allowing people to put their own vehicles up for rental at times when they are not being used. Getaround and Hiyacar provide this service.

Meanwhile the 'shared rides' concept sees motorists offer spare passenger seats to other people travelling to either the same destination or in a similar direction. BlaBlaCar, Faxi and Liftshare are among those providing this service.

A report last year from the Commission on Travel Demand said there is great potential to share vehicles and journeys, pointing out that more intensive use of fewer cars can provide a cost effective way to help cut carbon emissions. However it warned there is often no coherent approach to integrating shared cars within a wider set of mobility options.

Antonia Roberts emphasises that car clubs must be just one component involved in breaking people's private car habits, alongside high quality and affordable public transport and active travel. "None of this works if people don't have alternative modes," she says.

Certain demographics of the population are more open to sharing, but public attitudes can be a challenge. Antonia says that 'sticks and carrots' are needed to encourage wider adoption of car sharing.

"Currently most people have no incentives to get rid of their private car. But as we see more bold and ambitious measures brought in by cities to put proper prices on car use, the balance will shift," she says.

Authorities can help by allocating on street parking bays to car clubs and giving them exemptions from charging initiatives, she suggests, adding that the process of joining a car club must be as convenient as possible.

Zipcar's UK general manager James Taylor agrees. "If we are going to help cities achieve climate objectives, we need to look at transport in the round and consider how car sharing can help."

He says changing behaviours is a major hurdle, but feels public attitudes are beginning to shift. "Owning a car used to be a status symbol but now

Onboard the 'Harborough Express': Bernard, Jessica and Janna (with laptop) from Leicestershire County Council share their commute a few days a week, from their homes in Market Harborough to the office in Glenfield, a round trip of about 95km. They use a WhatsApp group to arrange rides.

Each time one of them leaves their car at home, they save around £8. Car sharing, they agree, encourages each of them not to work too late – a passenger can finish a work task during the journey – and is a more sociable way of commuting.

Ride pooling promises more efficient journeys

Introducing drivers with empty seats to passengers looking for a lift is the concept behind ride sharing, which could help to make far more efficient use of the private vehicle fleet.

The Commission on Travel Demand estimates there are 36 million empty car seats every day during the morning commute. A number of services are now seeking to fill some of these seats.

One service provided by Faxi engages with businesses to offer incentives to employees to car pool, using anonymised location data and a smartphone app to connect drivers with passengers.

"We think every company of a significant size is going to have to take responsibility for the emissions of their commuters," says company founder Tony Lynch. "The minimum they should be doing is connecting employees who drive past each other."

So what incentives are offered for people to share? In many cases, multi occupancy vehicles are given exclusive access to priority parking. This also benefits companies struggling with a lack of parking capacity.

This approach led to an increase in carpooling from 2% to 20% among employees of Northamptonshire County Council, helping it to overcome a lack of on site parking, Tony says. "Sharing rides can cut the personal cost of transport and reduce environmental impact."

↑ **Commuters in France are benefitting from ride sharing, which promotes social interaction** BLABLACAR

Another company – BlaBlaCar – has launched a commuting service called BlaBlaLines in France where strangers can share lifts with drivers travelling along a similar route in exchange for a small fee.

"To do this you need to be able to match people with high precision in terms of time and location," says company vice president Philippe Cayrol. "As a driver, you don't want to make a 10 minute detour when you are commuting; it has to be seamless."

Philippe adds that the service does not compete with public transport, but provides an option for people with poor access to trains and buses or who would otherwise have to make complicated, multi leg journeys.

"People will use this as part of a suite of solutions available to them."

many people want access rather than ownership."

Evidence shows that car club membership tends to lead to an overall drop in the number of miles that people drive, he says, with members making "much more considered choices about which mode is right for the trip".

In rural areas, car sharing could have an important role to play in giving people first and last mile travel choices, according to Mobility as a Service specialist Jenny Milne. Initiatives in small communities tend to be less formalised, she says, but introducing just one or two shared cars can make a big difference.

"All it takes is one person to have the appetite and vision to make it happen." Jenny adds that better use of private cars can also help to boost mobility options in rural areas. "We don't need to reinvent the wheel, we just need to be smarter with the wheel we have got.

"If you own a car, think about how can you make better use of it."

Scottish scheme makes community impact

Local residents of Moray in north east Scotland are benefitting from a grassroots car sharing scheme set up for community benefit, with carbon reduction strongly in mind.

The Moray Carshare has been running for over a decade and has over 200 members, who can access a fleet of around 20 vehicles including five electric cars on a pay as you go basis.

The scheme's manager Gordon McAlpine says the car club attracts a range of members including people who use the club instead of owning a second car. Survey data shows that a main reason for joining is to help the environment, he adds.

As a result, the electric vehicles on offer are the most popular. "Electric cars are expensive and lots of people would like to use one, but can't afford to buy. That's where we fill a niche.

"We are a social enterprise building up assets within the community; people really feel a sense of ownership. If we make a profit, it all goes back into the club."

However he noted that while rural car sharing services can fill a gap left by a lack of public transport, they often need a little support from Government to keep them developing.

"We have demonstrated that communities can empower themselves and come up with creative solutions," Gordon says. "If you get a good project idea, there is funding available that you can tap into. But you have to be willing to put energy into it."

↑ **Gordon McAlpine charges up one of five electric car club vehicles offered by the scheme** MORAY CARSHARE

Fenland locals push for green routes

↑ Housing developments in the Deepings will be expected to deliver infrastructure for walking and cycling RAMBLERS

Community action can make a crucial grassroots contribution to encouraging walking and cycling, as demonstrated by those living around Market Deeping and Deeping St James on the Cambridgeshire / Lincolnshire border.

Residents have developed a 'Deepings Green Walk' standard in the local neighbourhood plan to ensure that all new housing developments provide safe, accessible and linked infrastructure for active travel.

Developers are expected to deliver 700 to 800 new houses to the north and north east of the two parishes.

"If anyone moves into a new area that has been developed we want them to be able to find their way by foot and cycle, rather than getting in their car for what could have been a 20 minute walk," says Pam Byrd of the Deepings Neighbourhood Planning Team.

"We want to ensure that we are a healthy town as we grow."
Pam Byrd

A further ambition is to build up a network of new cycling and walking routes including a 15km outer circuit of 'the Deepings' in order to better join up local facilities, housing and green spaces.

"We want to ensure that we are a healthy town as we grow," adds Pam. "It's about developing a culture where walking and cycling is the normal way to go about."

The neighbourhood team is also looking to move active travel routes away from roads and into pleasant green spaces, where possible.

The Deepings Green Walk initiative was highly commended in last year's Transport Planning Day 'People's Award' and also received special recognition from the Ramblers in its competition to find Britain's best walking neighbourhood.

"The negative impact of climate change can only really be lessened if each and every one of us changes our own behaviour," Pam adds.

"We don't need to wait for new laws to pass to think that walking might be a better option. But if infrastructure is there in your neighbourhood, that helps to make it a lot more attractive."

Mini-Holland lessons from east London

Radical active travel infrastructure schemes are needed to bring about modal shift and tackle the climate emergency, according to Waltham Forest Council's deputy leader Clyde Loakes.

The councillor has overseen the establishment of a 'Mini-Holland' in the outer London borough over the last six years, which has now delivered 29km of segregated cycleway.

Waltham Forest is one of three areas in London with Mini-Hollands and last month the Government announced plans to roll out dozens more around the country.

In Waltham Forest, town centre and 'village' improvements for the benefit of cyclists and walkers have been complemented by several low traffic neighbourhoods. Hundreds of 'bike hangars' and secure cycle parking spaces have also been installed.

Clyde Loakes says the majority of planned infrastructure is now in place and the initiative is making a difference. "The work we have done should allow anyone aged eight to 80 to move around the borough on two wheels."

Department for Transport data shows Waltham Forest to be the most active outer London borough and evidence points to a significant reduction in households exposed to illegal levels of NO_x emissions.

One early 'village' scheme delivered in Walthamstow as part of the programme saw cycling trips rise by 28% and walking by 19%.

Clyde Loakes says that the climate emergency – coupled with other societal challenges including obesity and air pollution – makes investing in active travel an imperative for local authorities.

↑ A segregated cycleway in Waltham Forest

"We have to de-prioritise the motor car and its demands in town centres and residential streets," he says. "There is no point tinkering around with small scale schemes. Councils have got to bite the bullet and deliver radical schemes that will make a difference."

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Electric mobility enjoys a surge of support in Scandinavian city

↑ An electric bus passes through the centre of Gothenburg, a city with ambitious environmental plans ELECTRICITY GOTEBORG

Sweden's second city Gothenburg aims to run an entirely carbon neutral public transport system in 10 years, featuring electric buses.

Passengers catching a bus from the Lindholmen science park in Gothenburg do not wait beside a stop on the street in the rain. Instead they walk through a door into a small enclosed building featuring a customer lounge, before stepping aboard. When departure time approaches, a shutter rolls up to allow the bus to drive away.

The indoor bus stop at the northern end of route 55 is – as you may have guessed – used only by vehicles emitting no pollutants; either fully electric buses or hybrids running on electric, rather than diesel, power when in the vicinity.

When the indoor bus stop launched, the customer lounge alongside was even converted into a temporary public library to demonstrate that electric buses are not only cleaner than conventional vehicles, but quieter too.

"Political will is growing to encourage greener modes of travel."
Hannah Björk

↑ Route 55 starts inside an indoor bus stop ELECTRICITY GOTEBORG

"We are showing it is possible to have public transport that can come closer to the people," says mobility director Peter Nordin of Volvo Buses, a partner in the 'ElectriCity' partnership working to develop sustainable urban travel systems in Gothenburg.

Once out on the road, a geofenced 'zone management' system registers when the bus is in a more environmentally sensitive area and automatically switches the vehicle's control to electric propulsion.

The system also limits the maximum speed of the bus in areas where there are higher numbers of pedestrians and cyclists. In addition, buses can drive autonomously in depots to reduce the number of knocks and scuffs suffered to trim and tyres at low speeds.

"In a recent survey we found that one in three passengers would be willing to pay more to travel on route 55," Peter adds. "There is a positive business case for electrifying public transport."

City of Gothenburg's traffic department head Malin Anderson says all buses operating in the city by 2030 will be electric, as the authority looks to reduce its carbon emissions by 80% over 20 years.

"The future of transport in city centres needs to be less polluting, energy efficient and silent; therefore electric buses are very good. We found that some people skipped one bus and waited for an electric one as they are smooth and there are no vibrations."

She adds that the trial of autonomously driven buses along part of the route could be extended to cover private motor vehicles. "We know that more than 50% of kilometres driven in the city are above the speed limit.

"This represents a problem for safety but also has an effect on the energy spent and carbon dioxide emissions generated by transport."

Regional transport authority Vasttrafik's head of sustainability Hanna Björk says that several bus routes in the area are converting from diesel to electric power in support of Gothenburg's aim of decarbonising public transport within a decade.

Today there are 67 electric buses operating in the region and by the end of this year another 160 will be added. This number is expected to swell to 700 by 2030.

"Political will is growing to encourage greener modes of travel and sustainability is high on the agenda," she says.

To encourage commuters to switch modes and try the bus, car drivers are offered a free ticket for two weeks – and many continue riding as paying passengers after that, Hanna adds.

In the last eight years 100,000 car

New infrastructure set to enhance connections

Redevelopment of former shipyards to the north of Gothenburg is expected to see the city's urban area double in size and its population increase by a quarter. A project known as 'RiverCity' will see 25,000 new homes and 50,000 jobs created by 2035, taking Gothenburg's population up to around 700,000.

To provide an enhanced new link, the Hisingsbron bridge is under construction across the Gota river for both private vehicles and trams. Elsewhere in the city, two tunnels are being built: the Marieholmstunneln road tunnel and the West Link railway tunnel.

The former is set to divert motorway traffic between Stockholm and Oslo away from Gothenburg, and the latter will serve two new stations and an enhanced Central station.

City of Gothenburg's urban development director Magnus Sigfusson says public transport is being enhanced so that more people can travel in from the suburbs and arrive at different points in the city; relieving pressure on networks that currently serve the Central station.

"We are looking to develop a train system that flows better and is more resilient, so people can be redirected if there are problems."

"How we use cities today will change in future."
Magnus Sigfusson

↑ Major development is planned on both shores of the city

He adds that better public transport will also suit changing demographics. "For every 100 people between the ages of 18 and 65 in Sweden there are 74 who are either younger or older. But in the next 40 years, we will see 92 children and older persons for every 100 adults."

Magnus says that cities around the world have to adapt to a decline in high street shopping, increased need for social meeting points and possible introduction of autonomous vehicles.

"A lot of the structures were put down hundreds of years ago and we need to be flexible in our thinking," he adds. "How we use cities today will change in the future."

drivers are said to have given public transport a go.

Electric propulsion has also been introduced recently to power a passenger ferry operating between the city and the Lindholmen science park; now a growing employment zone. And last mile deliveries in the city are often carried out by cargo bicycles from a logistics hub beneath the city's main shopping mall.

But one challenge that cities must address is how to provide sufficient public charging infrastructure for electric cars. Development agency Business Region Gothenburg's project manager Joel Görsch says that around 80 to 90% of charging is at home or work, "but to get electrification to be successful, we will need public charging as well".

However charging is discouraged on the street outside people's homes in Gothenburg, he points out, so plans are being taken forward to install communal charging points in garages throughout the city, not too far from where people live.

"Switching from combustion engine to electric vehicles is going to be challenging and many companies are employing a lot of people to help develop new technology," he adds.

"But while there will be a shift to electric vehicles, we have to think about what happens to the secondary market. Petrol and diesel cars will be with us for a while."

"City centre transport needs to be less polluting."
Malin Anderson

↑ An electric ferry provides a shuttle service to Lindholmen

Mobility app on test

Clever ideas on test at the Lindholmen science park in Gothenburg include a sustainable transport project known a LIMA designed to encourage shared mobility.

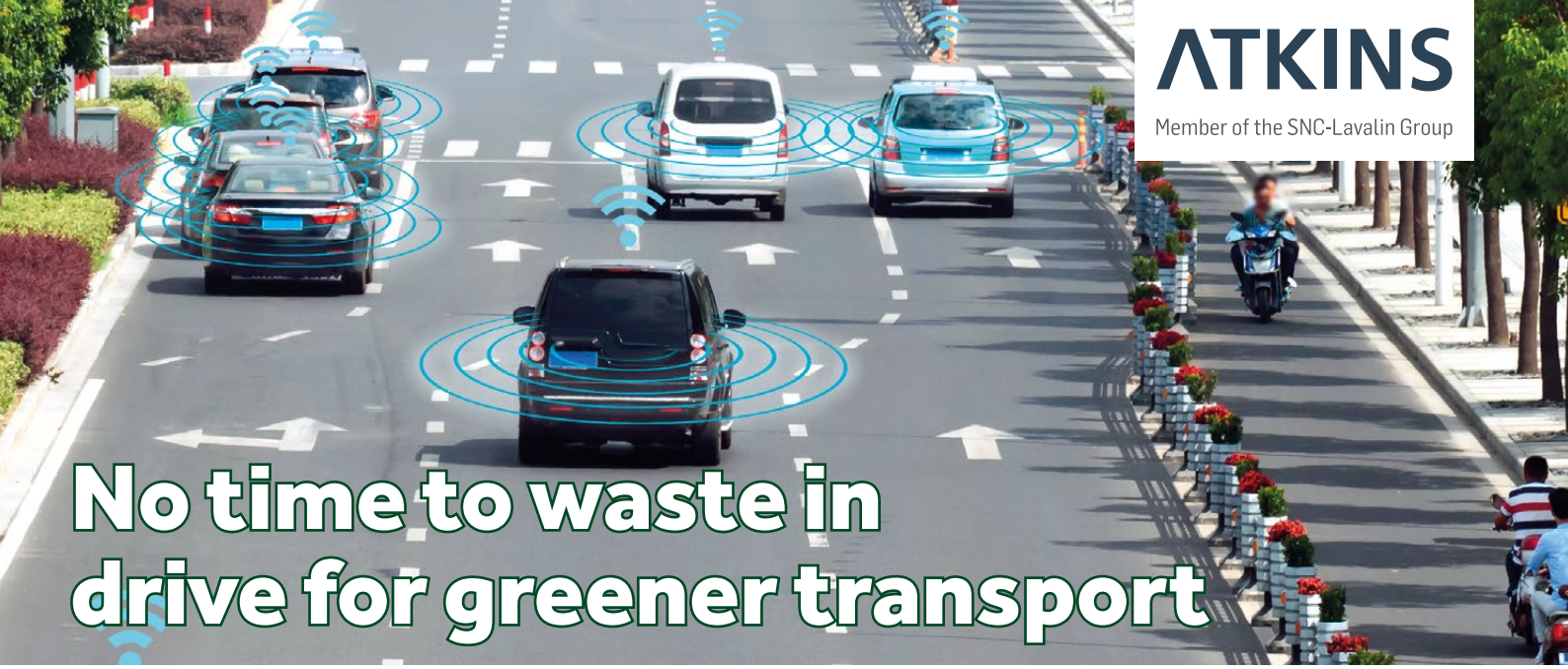
↑ Sofia Löfstrand

"Gothenburg is growing and many people are used to driving their cars to work, but we have to consider travel in other ways in order to reduce emissions and the number of vehicles on the street," explains project manager Sofia Löfstrand.

LIMA is a Mobility as a Service platform which is being tried out among companies on site and their employees. It was rolled out to the wider region last month for a one year trial. It involves giving participants access to all modes of transport and presenting them with one bill for their personal and business travel.

"We are trying to provide greater accessibility to services and better information using the one app," she adds. "We give people the options of routes, services they can use and how much it costs."

Sofia acknowledges that many car owners like the comfort of their vehicle and it will take a change of mindset to encourage some people to change their travel behaviours.



No time to waste in drive for greener transport

↑ Connected highways promise to play their part in helping society to reduce its carbon emissions ZAPP2PHOTO – SHUTTERSTOCK

Encouraging the switch to low emission vehicles and future proofing infrastructure with development of digital roads will be core enablers in helping the UK to achieve its net zero carbon aims.

Efforts made over the next five years to combat greenhouse gas emissions will have the greatest impact on mitigating climate change and enabling the country to meet its 2050 net zero carbon target, a technical director with Atkins says.

Dr Wolfgang Schuster, who until recently led the company's intelligent mobility and smart technologies division, says: "We need to achieve the largest reduction in our carbon footprint early on if we are to meet the target.

"We have started to make progress but there is clearly a lot more that can be done; we cannot become complacent. We need to be as ambitious as possible. Much of the technology that helps reduce greenhouse gas emissions is already there to achieve our goals faster."

Wolfgang says that everyone has an important part to play in reducing emissions, from members of the public choosing to change their travelling habits, to policy makers promoting electric vehicles and transport planners who can integrate net zero thinking into their work.

"We need to achieve large reductions in our carbon footprint early on."
Wolfgang Schuster

↙↓ Stakeholders must work together to achieve net zero by 2050
OLIVIER LE MOAL AND ETIAMMOS – SHUTTERSTOCK

But one important consideration to remember when aiming for net zero is to avoid shifting a problem from one area or sector to another.

Take electric vehicles: if cities decide to restrict access to only cleaner cars in order to improve local air quality, could that lead to an increase in emissions elsewhere or place an additional burden on the energy sector?

Where is the energy used to power an electric vehicle coming from: renewables such as wind or less environmentally friendly sources? What are the implications of the whole lifecycle of assets and what is the carbon footprint during the manufacturing stage?

Which countries are generating the energy needed? And what could a mass adoption of greener cars mean for the energy supply needs of recharging?

"These are all questions we need to look at carefully to understand the wider implications of encouraging electric vehicles," he adds. "We need to be very mindful of not addressing a problem locally but creating more pollution elsewhere.

"If we replaced all internal combustion engine vehicles with electric vehicles today, we would overload the current electricity network, so there is a question over how that can be managed so that we can cater for demand at all times."

One exciting future development is the smart city, where connected vehicles can be made to negotiate heavily trafficked junctions more efficiently, thereby reducing environmental impacts. "The digital road is set to become a core enabler in tackling emissions," Wolfgang says.

Another important factor to consider is the level of trust between members of the public, industry and Government. Individuals who decide to reduce their vehicle miles in favour of using public transport, walking or cycling will want to be reassured that their efforts to reduce their carbon footprint will be matched by achievements made elsewhere.

So what can be done? "There is an element of informing the public and getting them involved in the journey," he adds. "Consultation, engagement and helping people shape the solutions are crucial. The easiest way to achieve cultural shift is to allow people to help.

'Atkins' recent work with the FLOURISH driverless cars project showed how important it is to engage with end users to help generate a shift in the mindset of people when it comes to autonomous vehicles. The same consideration applies when talking about electric vehicles and more generally reducing carbon emissions."

Wolfgang adds that Government has an important role to play in "bringing together the pieces of the puzzle" to align various sectors and ensure the UK can meet its carbon commitments.

He is optimistic that the transportation sector can help the UK to meet its net zero carbon target. "There is a huge potential for us to solve this challenge. We need to make sure we stay focused, are ambitious and accelerate our actions now."

This article has been produced in association with Atkins.

Cleaning dirty air at junctions

Busy town centre road junctions could soon be cleansed of noxious gases and particulate matter if a new air purification system wins favour among highway authorities.

Powerful fans draw vehicle emissions down into a network of sub surface pipes, for cleaning in a roadside unit featuring a series of filters. Clean air is then released back into the atmosphere.

A prototype of the system has been tested on private land in Hertfordshire and three local councils in the UK have recently agreed to install the device at junctions, including one close to a school.

Pipes carrying dirty air will run no more than 500mm beneath the road surface, and grills can be positioned at regular intervals on the approach to a junction to pull in polluted air.

The system could be linked to traffic light controls – allowing the fans to activate just before vehicles are expected to gather at a red signal – or be switched on as stationary vehicles are detected.

"Treating pollutants is nothing new, but what is new is the idea of cleaning the air at source of the pollution; air that people breathe as they walk down the road and sit in their cars," says entrepreneur Thomas Delgado, whose company Pollution Solution has developed the system.

He acknowledges that many modern vehicles have engines that can cut out when stationary, but points out that some drivers decide to deactivate them. And while Thomas welcomes efforts to remove the worst polluting vehicles from urban areas, "we need an interim solution to capture pollution now.

↑ Thomas Delgado hopes to tackle pollution at busy junctions

"Forty thousand people in the UK die prematurely due to air pollution every year; this is not something we can continue to ignore," he says.

His company has worked with air flow engineers and mathematicians as well as two universities in London to develop the system. He adds that acoustic insulation can be installed beside the filtration equipment to reduce ambient noise.

Change is needed now says climate professor

Transport emissions will have to be eliminated within 15 years if the UK is to stand any chance of meeting its obligations to tackle the climate emergency, a leading academic has said.

Kevin Anderson, a professor of energy and climate change at the University of Manchester, told *TP* that all vehicles in service after 2035 – and not just new sales – will have to be zero carbon to meet the Paris Agreement of keeping temperature increases below two degrees this century.

He adds that policy makers should stop focusing on achieving 'net zero' by 2050 and instead aim at 'real zero' much sooner. "The term 'net' has slipped into the lexicon in recent years, but I want to see real zero by 2035," he says.

"I want to see emissions drop to 'real zero' by 2035, rather than 'net zero'."
Kevin Anderson

Is that a realistic proposition? "But is it realistic to live with four degrees of warming," he replies. "We have left it so late, that whatever we put forward now doesn't look viable."

Much of the problem of rising emissions is down to aviation, but private vehicles are to blame too. "Sales of sports utility vehicles swamp electric vehicles, so virtually all of the wonderful efficiency gains made by EVs are swallowed up by cars that have got faster and bigger."

Kevin adds there are plenty of things people can do to reduce the impact of travel on the environment and says: "Most emissions come from a relatively small section of the population. We need to see profound changes among particular groups in society." But this will mean that those who inform and introduce policy may have to put in place strategies that are likely to have a bearing on their daily lives, he adds.

If we do continue to buy cars, no vehicles should emit more than 100g of CO_2 per kilometre, he points out. "You can already buy internal combustion engine vehicles that produce 85g of CO_2 and have three seats in the back, so why are we selling prestige cars emitting 130g?"

He says each of us can take measures to reduce our environmental burden. "The obvious one is to reduce how often we fly and the second is to try and use public transport, walk and cycle rather than drive."

He adds that advertising could be used to encourage people to change their behaviours.

In terms of future prospects, he adds: "On climate change I remain of the view that we are very likely to fail, but we do have all the tools at our disposal. We can choose to succeed; it is in our grasp."

↑ In vehicle communication systems are already helping to reduce the environmental impact of motoring METAMORWORKS – SHUTTERSTOCK

Connectivity set to cut carbon emissions

Development of connected, digital transport infrastructure promises not only to improve mobility for people but could help tackle the climate challenge too.

Advanced technologies being deployed on pilot schemes in the Midlands and Kent are helping champions of future low carbon mobility, including Costain, to gain a better understanding of how infrastructure and vehicles can communicate with each other to help shape not just a safer transportation future but a more sustainable one.

Fully connected infrastructure where modern vehicles and fixed assets can 'talk' to one another is essential to achieving 'net zero' carbon emissions from transport, says the company's solutions director John Batterbee.

Connectivity will not only facilitate the integration of electric vehicles and reduce pollution due to stop-start traffic, it will enable the most effective design of a low carbon, multimodal transport system that can easily be navigated by people seeking a seamless, low carbon journey, he adds.

Developments in connected and automated mobility go hand in hand with the push for greener motoring.

"Over the next few years we'll see scale up of ultra low emission vehicles. Electric vehicles, for example, have large batteries, which means there is flexibility on how and when they are recharged," says John.

"Connectivity is essential for enabling them to be recharged when there is a plentiful supply of low carbon electricity and to avoid excessive strains on the grid."

Systems that allow vehicles and infrastructure to communicate are currently being tested on several heavily trafficked routes as part of the Midlands Future Mobility testbed.

This builds on the award winning A2/M2 project in north Kent, where Costain worked with Highways England, the Department for Transport, Transport for London and Kent County Council to deliver one of the UK's first connected vehicle corridors on a live road.

"Connected and automated technology is not only tackling congestion but also helping to improve local air quality as less braking means fewer small particles are released into the atmosphere," says John.

"The data from vehicle and roadside sensors, such as cameras, and smart analytics can predict if a traffic jam is likely to occur and provide a richer picture of what is ahead. This helps drivers to optimise their speed and reduces the chance of a build up of vehicles on the road, thus reducing the emissions associated with traffic jams."

"Connected and automated technology is helping reduce emissions."
John Batterbee

Intelligent road technology forms part of an innovation project funded by Highways England. Known as Connected Digital Roads, it will enable connected vehicles to respond to traffic information provided directly to them by the highway operator.

"To maximise the carbon reducing benefits of 'intelligent' and 'intuitive' mobility products and services entering the market at pace, it's important that infrastructure side technology becomes as 'intelligent' as vehicle side technology," adds John.

He points out that it is also important for infrastructure operators, automotive companies and mobility services firms to come together now to understand how a connected, multimodal transport system can be designed to help the UK meet its carbon reduction commitments.

"Digital connectivity enables you to provide live information during a journey, such as where the park and ride is and when the next bus is due. This will make low carbon choices much more straightforward and so help further reduce congestion, local air pollution and carbon emissions."

This article has been produced in association with Costain.

↑ Practitioners involved in transportation have an important role to play in cutting carbon and promoting sustainable travel PETRMALINAK – SHUTTERSTOCK

Sector collaborates to combat emissions

Setting targets for carbon neutrality, placing greater emphasis on sustainability during procurement and ending silo working were points for action from the first meeting of a group of key industry stakeholders, convened by CIHT.

Positive measures that organisations in highways and transportation should take to tackle climate change and reduce emissions were identified at the inaugural meeting of CIHT's Partnerships Network in February.

Representatives from contractors, consultants, public sector organisations and specialist suppliers came together in London for an afternoon workshop session to explore policy responses to this pressing issue with the Institution.

"The transport sector is a significant contributor to carbon emissions and we need to do something about it. We have a responsibility as an institution and as a sector to respond to that," said CIHT chief executive Sue Percy, who welcomed around 30 participants to the event.

Sue Percy added that the new Partnerships Network – comprising Strategic Partners, Knowledge Partners, Public Sector Partners, Research & Education Partners and Affiliate Partners – was set up to enable meaningful engagement with the sector and help shape CIHT policy.

"We are bringing together a range of people and organisations from different parts of the sector," she explained. "As practitioners we need to be reflective and make sure we are listening not just to those who are saying the same things as ourselves."

Attendees to the climate change workshop split into four groups, which discussed in turn a set of four questions related to the climate agenda. Key feedback was then reported back to the room at the end of the exercise, and is summarised for each question as set out here:

"We need to listen not just to those who are saying the same things as us."
Sue Percy

What is your organisation doing to mitigate / adapt to climate change?

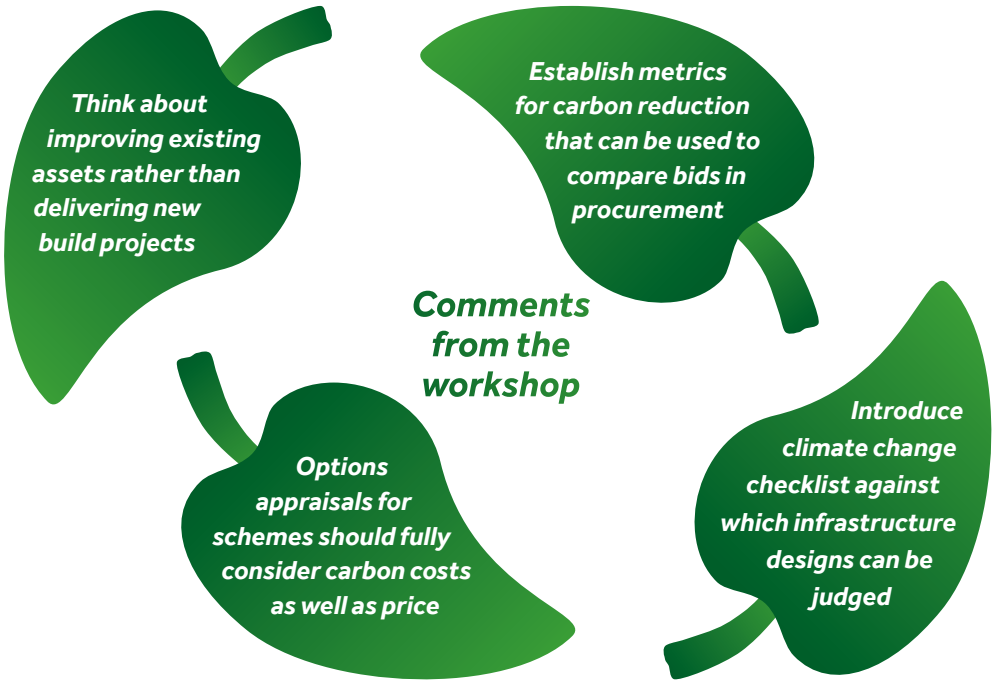
Several companies in the sector have set target dates for achieving carbon neutrality, which come before the Government's own 2050 deadline. The importance of mapping out policies and strategies based on these target dates was emphasised.

One firm involved in designing transport infrastructure projects highlighted the introduction of climate change checklists against which designs can be judged. It was also said that options appraisals for schemes should fully consider carbon costs as well as price.

Ensuring compliance with the United Nations' Sustainable Development Goals is also a focus for firms and many in the private sector are encouraging their clients to adopt these.

Contractors delivering road maintenance spoke about the use of innovative materials, such as warm mix asphalt, in road surfaces to lower emissions.

Companies are also looking at improving the efficiency of these schemes through better work flow planning. Some contractors reported that their vehicle fleets are being transitioned to more sustainable fuels.



What should CIHT do?

Influencing national policy and taking a position of sector leadership to tackle the climate emergency were considered to be among the key roles for CIHT.

The Institution was encouraged to promote standards and best practice for carbon reduction and to review current industry guidance, specifications and tools around sustainability, with the support of the Partnerships Network.

It was also urged to advocate a set of sustainability metrics against which highways and transportation projects can be evaluated. Importance of monitoring the impacts of schemes after completion – for example to measure their active travel benefits – was also emphasised.

CIHT could also set its own targets for reducing emissions, and monitor the carbon footprint of its events programme.

What investments should the sector make to positively support the agenda?

Clients should place higher emphasis on considering the environmental credentials of companies bidding for work on projects, participants agreed.

Consensus was reached that industry wide metrics for carbon reduction should be established that can be used to compare bids in the procurement process and incentivise companies to 'do the right thing'. "What gets measured gets done," one participant observed.

Investment in research and innovation was also encouraged in order to help find solutions to the climate change challenge, including trials of new technologies, techniques and materials.

At a policy level, investing in resilience and adaptation measures was considered vital to mitigate against the impacts of climate change – which include more extreme weather events – on transportation networks. Road pricing was also discussed as a means of incentivising more sustainable travel behaviours.

What should we stop doing as a sector?

An end to working in silos and lowest price tendering were among the key requests brought up by workshop attendees.

Instead they urged assets to be thought about in whole life cost terms and said projects should start to be measured against sustainability, health and wellbeing outcomes.

It was also considered that new build projects should be reconsidered in some cases to improve existing assets instead. In addition, developments should stop being built where few alternatives to the private car are available.

A lack of long term funding certainty is also unhelpful for driving innovation in the sector, it was emphasised.

In addition, participants called for an end to so called 'greenwashing' – where a false impression is presented as to a product's environmental credentials – in advertising for cars and airlines.

● Members of the Partnerships Network are signatories of CIHT's Climate Change Pledge. A CIHT Ringway Climate Change Award is also set to be presented at the Institution's annual Awards Dinner at the Hilton London Bankside hotel on 11 June.

The next Partnerships Network event will be on 23 April.

For more information visit: *ciht.org.uk/partners*

↑ Workshop participants discussed the industry's approach to climate change

Exploring the future scope of road condition surveying

Emerging technologies used to gather asset data and the sharing of recent experiences from sites promise to help authorities improve highway condition, says Justin Ward.

'Disruption' is a common word when applied to business: just consider how Amazon changed retail and how both Uber and Tesla have entered – and could further disrupt – the car industry.

The same is happening in the roads sector, in terms of the data available to highway authorities to understand the condition of their networks.

Recent years have seen advances in video capture technology, big data and more accurate depreciation software that have shown a potential to drive benefits to local highway authorities.

Machine learning applications are also supporting decision making and showing impressive results. An artificial intelligence system developed by Google, for example, was found to be more accurate in detecting breast cancer than human radiologists.

Surely the time is right for the highways sector to start taking advantage of such developments and apply them to the process for collecting and analysing data from roads and associated infrastructure that make up our highway network.

But what does this mean for national reporting requirements? Is there a challenge for consistency? And what does it mean when we start to see data being collected from other third parties such as the automotive sector to align with connected and autonomous vehicles?

Other wide ranging questions to be asked include who collects and owns data on road condition. It is clear that highway authorities will only be able to make best use of available funding to maintain our roads if they can target such funding well, and this requires good data on their assets.

A report from Parliament's Transport Select Committee last year highlighted that the Department for Transport currently only publishes basic headline data on road condition.

↑ Better data could lead to improved roads

DARIUSZ GORA – SHUTTERSTOCK

"It's time to consider how we make best use of technology available."
Alex Wright

The Committee noted that while this is a useful tool to compare a single data set over time, it is limited in scope and does not provide the sort of detail given in other third party condition surveys.

The Committee welcomed the Department for Transport's review of road condition surveying data and technology. This review started last year and has been further explored by TRL's chief technologist Dr Alex Wright in his paper 'Local Roads Network Condition Monitoring: A new approach'.

The paper considers how local authorities can make better use of asset survey data and talks about the new 'VOCAL' Roads Group – Vision for Objective Condition Assessment of Local Roads. Aims of the group include exploring how asset managers can select the right inspection regime, be confident in their data and get best value from inspections.

The Code of Practice 'Well Managed Highway Infrastructure' states that establishing an effective regime of inspection, surveying and recording is the most crucial component of highway infrastructure maintenance.

These inspections provide the data on which local road asset managers rely to make robust maintenance decisions. However, local authorities have many options available to them when designing inspection regimes.

Just as traditional network visual inspections such as CVI – undertaken on foot or from moving vehicles – gave way to routine SCANNER surveys in the 2000s, newer survey technologies are now becoming available. These draw on emerging technologies that can provide evidence of great value to asset managers.

Alex Wright said the VOCAL Roads Group has approached both local authorities and survey companies to be part of its community and says that if a survey company found something successful, it is a good idea to make sure everyone knows about it.

He goes on to say: "The technologies

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Roads: James Bailey
Lighting: David Denner
Bridges: Liz Kirkham
Network Management: Mark Kemp
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↑ **Highways England's 'Harris 3' survey vehicle**

↗ **Texture and defects displayed in colour** TRL

have moved on but national survey specifications such as SCANNER haven't. SCANNER survey systems now use the latest 3D surveying tools, but the data delivered is limited by the specification.

"Companies with new technologies are not constrained by this. It's time to consider how we are making best use of the technologies available to us."

One company working in this area is Gaist, which carries out highway surveys and provides detailed map layouts of a road environment, including full and part detailed network condition maps covering the carriageway and footway condition.

Other companies including Vaisala – known for its technology in winter service operations – have moved into the road survey market. It uses dashboard mounted mobile phone video and machine learning algorithms to assess the condition and deterioration of roads.

Highways England also now collects information on road marking visibility in addition to road surface condition data.

Gaist's managing director Paula Claytonsmith says: "It goes back to what it is that you want and need to know, what is right for that particular authority and where it is in terms of data gaps. It's not about data for data's sake, nor is it about restricting innovation by creating hard edges or monopolistic views by private sector organisations."

The aim of the VOCAL Roads Group is to bring together best practice and real world experience of how to make best use of condition data. This suggestion has been welcomed by the Road Condition Management Group.

VOCAL could help local highways authorities to bridge gaps in knowledge resulting from changes and reductions in resources and may help local highway authorities better engage with their data, sharing knowledge, experience and lessons learned across the industry. This would help asset managers to make better decisions and save money.

"There's going to be all sorts of data soon. You can't keep a box around it."
Paula Claytonsmith

The group is in its infancy and is now seeking interest and engagement from local highway authorities to understand how they would help such a group to evolve – including what it could do for them and what they could do to support its aims. Alex Wright adds: "Everyone is encouraged to get involved, so that the community can get the best from its valuable data asset."

The last UK Roads Board featured a discussion on road condition surveying and a challenge for the sector that although innovation is being encouraged, current rules do not always allow for this.

The pace of innovation is fast and regulations and rules to keep pace need to respond. This is an area the Department for Transport is considering as part of its review as highlighted in evidence to the Transport Select Committee.

We are in a time where some companies are offering 'vision based' self driving car and advanced driver assistance systems and are starting to collect data that could support asset management. But how could defects identified by vehicles be reported to highway authorities?

Alex Wright sees this new data as an opportunity for the sector but cautioned about going down blind alleys, adding that the VOCAL Roads Group would try to understand where standardisation, quality assurance and accreditation fit in, where it is appropriate and where it is not.

Gaist is starting to work with a national logistics company to review how this data could be used. Paula says: "There is going to be all sorts of data out there soon and you can't keep a box around it any more. What if a company said: 'You could have all this data for 1p per km?' – it should be a council's choice. shouldn't it?

"If data is restricted or mandated only by a few with vested interests then this could create an environment where companies or community groups outside of this publish their own data."

To get involved in the VOCAL Roads Group, register your interest at *vocalroadsgroup.org*

● Asset manager XAIS' software suite XA has been accredited as a UK Pavement Management System following the introduction of a new scheme by the Road Condition Management Group (RCMG).

"We are delighted with our UKPMS accreditation," says the firm's director Peter Davidson.

Colour coded approach to assessments

Data on the visual condition of the surface of local roads is provided by the Surface Condition Assessment for the National Network of Roads (SCANNER) survey.

The surveys provide an objective assessment of condition and their primary output – the Road Condition Indicator (RCI) – can be used to underpin decisions on local highways maintenance.

There are three indicators as part of the RCI:

- Green shows that a section of road is in good condition.
- Amber indicates that a road section is not in perfect condition, but would still offer a good driving surface.
- Red highlights that a section of carriageway is likely to be in poor condition and will probably need maintenance within the next year (pictured).

Steel city shows its greener side

Planting in urban public spaces not only promises to help prevent flooding and improve air quality but can reduce vehicle speeds and make people feel healthier says Zac Tudor.

Introduction

Sheffield city centre's Riverside business district has been transformed thanks to a project called 'Grey to Green'.

The area was once dominated by a dual carriageway, underpasses, dead spaces and metal railings which severed the local community. Completion of an inner relief road in 2008 diverted a lot of traffic away from the Riverside.

The city decided to create a distinctive feature out of redundant highway land by introducing planting to soften the surrounding architecture. This first phase extends for 700m and forms part of a projected 1.3km green corridor.

Gardens double as Sustainable Drainage Systems (SuDS) and include sculptures and generously sized footpaths to create a definitive sense of 'place', marking this area out as a distinctive and desirable business address.

The overall space incorporates local sandstone and there is both a direct 'quick' stepped route through the space and a 'slower' ramped path which winds its way through the boulders and planting on a 1:20 gradient.

Flush kerbs were introduced beside the roads to allow water to flow into 25 storage compartments known as swale cells, with control structures ensuring attenuation and subsequent run off during larger storms.

↑ Charter Street rain gardens in the city ZAC TUDOR

↓ Highway infrastructure in abundance before the scheme started NIGEL DUNNETT

Detail of the design

The location and scale of the new green landscape were influenced by the need to retain a link for public transport, pedestrians and cycles and a desire to create attractive spaces for people who work in, live in and visit the city. The road is now a narrow carriageway with only one lane in each direction and features a 3m wide cycleway.

A spatial framework was created for how the SuDS would be designed and what they could deliver in terms of hydraulic benefit. Essentially the drainage systems are used to manage surface water, treat it at source and provide an opportunity for water to be part of the landscape.

The scheme manages flows from new paved pedestrian and cycle surfaces as well as from half of the highway width.

Shallow swales beside the carriageway are formed using engineered soils made from 100% recycled materials. The structural planting is a diverse mix of perennials, grasses, shrubs, trees and bulbs helping to provide seasonal interest.

Twenty five check dams alongside the swales contain water flows and there is also provision for below ground control through protected orifices and above ground weirs.

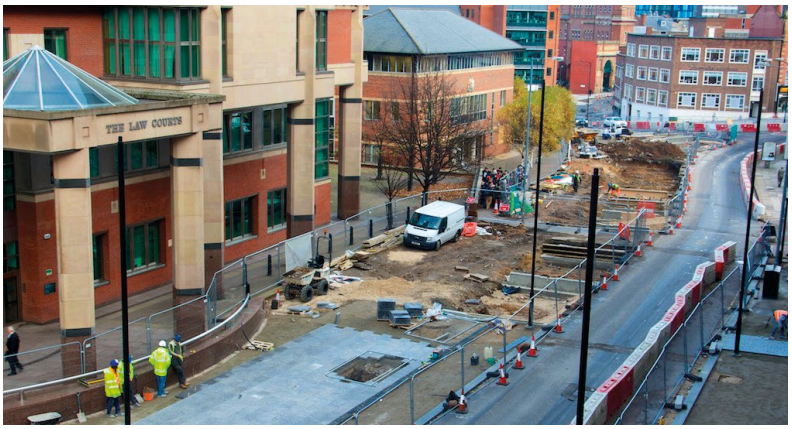
Within the swales, a crushed stone mulch absorbs energy from the run-off and allows sediment to be deposited along the road length, reducing the likelihood of localised accumulation and allowing the natural breakdown of highway pollutants such as hydrocarbons.

The drainage system is largely unlined and every day flows remain around the plants. Overflows pass water to adjoining cells via a network of perforated pipes, control chambers and distributor pipes.

Orifices at each check dam were modelled to optimise the system's storage to provide between three and four hours of drawdown of run-off within each cell.

Overtopping of the check dams is controlled with slot weirs and horizontal cut outs. In extreme rainfall events, water is able to overtop the whole dam which is set just below highway level.

Flows out of the system take place through domed inlets to reduce the risk of blockages and controlled and cleaned flows are discharged into the River Don.



↑↗ Grey to Green during and after construction
NIGEL DUNNETT

Public engagement

Consultation on the plans with local business and residents prior to the scheme starting revealed many people were concerned about the poor local environment and a lack of social space.

The project was developed alongside the Riverside Business Association. Meetings and public exhibitions addressed concerns over congestion and diversions during the construction phase and individual businesses were contacted to inform them of key dates.

Robust design principles were introduced to the footpaths, concrete check dam walls, highway edge details and water control mechanisms. In a city famous for manufacturing, substantial elements of engineering such as outfalls and grilles are celebrated as positive aspects of design, rather than hidden or disguised.

Development of the 'Grey to Green' scheme has led to a reduction in the total street costs associated with maintaining bituminous surfacing, gullies and traffic management equipment. Planting, on the other hand, only requires one cut a year.

Hydraulic benefits

An initial modelling process suggested that the scheme would have significant hydraulic benefits in slowing discharge off site to the River Don.

Infoworks (ICM) modelling showed that the scheme could contain a 60 minute, one in 30 year event, with discharge from the whole scheme to the river reducing from 47.3 litres per second to nine litres per second.

A one in 100 year, 60 minute event would start to overtop the weirs but nevertheless reduce flow rates from 69.6 litres every second to 9.2 litres every second.

Output from the drainage system to the river was estimated to be 12.1 litres per second for a one in 100 year event, plus a 30% contingency taking into account climate change.

The project coped well with recent storm events. Sheffield saw a one in 150 year flood event on 7 November where a month's worth of rain fall in a single evening.

All of the water from the project's catchment was held in the rain garden swales. Most of this water was lost to infiltration, with small quantities slowly released to the river after the storm event. Highway surface water ran immediately to the swale edges, rather than building up on the surface or ponding in low lying areas.

Zac Tudor is Sheffield City Council's principal landscape architect. His areas of focus include spatial masterplanning and placemaking to encourage economic regeneration.

↓ A mix of planting has been used
ZAC TUDOR

Success of the scheme

For Sheffield, the success of the scheme has been about seeing how multi-functioned a street space can be.

We have ended up creating an innovative green infrastructure project that sets the city's ambitions high for climate change resilience. It has also improved the quality of life for people and encouraged exercise and relaxation among users.

The scheme has demonstrated the advantage of using sustainable drainage and also improved local air quality. Other benefits include helping to reduce the speed of passing vehicles, an improvement to the urban environment, biodiversity and ecology.

It has also led to a 'city cooling' effect and the drainage system captures contaminants including micro plastics. Planting introduced is also drought tolerant, making it suitable for changes in temperature.

The space creates a strong hierarchy of movement helping to connect retail, leisure and through route activities. These clearly defined routes are then subdivided into a series of places that encourage rest and enjoyment.

Lessons learned

Close working with the city's highways teams addressed early fears over the design, such as around the flush kerb edge to carriageway. There is a need to challenge the default position of installing a lining membrane beneath SuDS features within typical inner city areas.

Despite site investigation work the precise location of underground services cannot always be fully determined. Design teams therefore need to remain agile in their approach to delivering a scheme if, for example, a high voltage cable is discovered.

Collaboration has been a huge factor in the project, which has seen long term relationships created with the University and local businesses.

Willingness to explore innovative approaches to public realm and the highway environment and an openness to managing risks can be helped by a co-operative team of in house designers with a strong stake in the success of the city. Phase two of Grey to Green is set to complete in June.

Acknowledgement

This article has been peer reviewed by the CIHT Urban Design Panel. To listen to a podcast interview with Zac Tudor visit spreaker.com/ciht

New approaches encouraged for better management of local roads

Establishing a new 10 year funding settlement for local highways and placing fresh focus on the network's role in tackling major societal issues are among the key recommendations of a new CIHT report.

The Institution's review 'Improving Local Highways – the route to a better future' proposes a four point strategy for the next decade that will allow local roads to deliver a wide range of benefits for the country.

Firstly, it says that a new vision should be created to demonstrate how local highways can help the UK to make progress on key policy areas including the delivery of carbon neutral, sustainable, resilient and healthy places.

Government is also urged to develop a clear system for monitoring the performance of the sector over the next five years – including emphasis on efficiency, effectiveness and innovation in delivery – to ensure money is spent wisely.

In addition, CIHT wants to see new outcome based service specifications and guidance for local authorities and other practitioners.

The second recommendation involves establishing a new 'Local Highways Fund' in the form of a 10 year additional funding settlement worth £15Bn (total expenditure) to address the current maintenance backlog on the local road network.

This fund should be additional to the current annual capital and revenue funding that councils receive to perform maintenance, it says.

A survey of CIHT members carried out for the review revealed that just 5% of respondents consider the current funding system as appropriate in supporting the local highways network.

↑ Maintenance activity should support active travel

TEJVAN PETTINGER – FLICKR

↑ CIHT advocates a 10 year funding settlement for local highways MICHAELPUCHE – SHUTTERSTOCK

The Institution proposes that an initial £7.5Bn should be allocated for the first five years and be distributed to local authorities on an annual, increasing basis while a new national asset condition dataset is introduced.

The remaining £7.5Bn should be allocated for the second period, with distribution to take account of local authority performance, asset condition and road function.

It is hoped that a new 10 year fund would lead to improved efficiencies in the management and maintenance of the local highways network, including incentivisation to deliver wider outcomes for people and society.

CIHT says this could, for example, allow maintenance activities to facilitate active travel, supporting the decarbonisation agenda while improving people's health.

However, along with the increase in funding it will be essential to create the evidence needed to allocate it. Current knowledge of the condition of the local highway network is lacking, the review found, which means investment is often not targeted where it has the most benefit.

An up to date database of national condition information needs to be created for all key highway assets and data collection techniques need to be updated, the Institution urges as part of its third recommendation.

A standard measure should be used to calculate funding allocations based on common standards of serviceability from a customer perspective, it adds.

The review's fourth recommendation emphasises the need to establish new sources of funding to support the proposed Local Highways Fund.

Government should identify and develop alternative and additional revenue sources to finance the future funding of local highways, such as exploring road pricing which would also address congestion and carbon emissions.

The Institution also emphasises the need for utilities firms to pay the real cost of reinstatement. This would mean firms being required to reinstate to best practice standard, or pay the local authority to do the work.

In addition, CIHT calls for Government to improve the efficiency of how funding is allocated to local highway authorities by reducing the number of funding streams and bidding processes.

For more information on the Improving Local Highways review, visit *ciht.org.uk/ilh*

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Call to prioritise transport spending

CIHT has urged the Government to fully recognise the importance of investing in highways and transportation infrastructure and services in the forthcoming Budget, which is set to be announced on 11 March.

Development of a national transport strategy, providing certainty for the sector on key projects and programmes – including the second Road Investment Strategy – and investing in sustainable and active travel are among the Institution's key asks in a submission to HM Treasury.

CIHT also urges the Government to commit to delivering the Institution's proposed four point strategy for the local road network (see previous page). A long term strategy for significantly reducing the number of people killed and seriously injured on the roads is also called for, alongside action on skills development.

A further ask is to create a statutory requirement for all transport asset owners to identify vulnerable areas of their networks, and for a central fund to be established to support resilience.

The Institution also emphasises how investing in highways and transportation would have a positive impact on key policy areas.

"Highways and transportation is not just critical to economic performance and productivity, but it addresses other key public policy areas where it is often not recognised as part of the solution and sometimes even seen as a barrier," said CIHT Chief Executive Sue Percy. "This Budget provides an opportunity for the Government to invest in the sector to deliver real solutions to environmental, economic and social challenges."

← Greater certainty on major schemes is urged
HIGHWAYS ENGLAND

On decarbonisation, investment to support a move towards electrification of vehicles and a shift to more sustainable modes is required, CIHT says. Spending on cycling and walking infrastructure can also support health and wellbeing outcomes, it adds, and improved integration of planning and transport is needed to develop more sustainable communities.

In addition, CIHT highlights the important role of transportation in supporting the economy as well as addressing inequalities in society – requiring inclusive networks designed and maintained for all users. And it emphasises the need for change in the way future transport is thought about to ensure the large investment required is used effectively.

The Institution also welcomed the Government's commitment to proceed with High Speed 2 last month. "CIHT has maintained a consistent position in support of the HS2 project as we believe it has clear benefits for capacity, connectivity and the economy if delivered in an appropriate manner," said Sue Percy.

"Certainty of timing, costs and improved information about the benefits of the project would help to increase support of more stakeholders," she added.

Qatar hosts celebration

Over 100 sector professionals gathered in Doha for CIHT Qatar Group's first ever end of year celebration dinner in December.

The occasion at the City Centre Rotana Hotel saw speakers deliver presentations on key projects and achievements involving the region's highways and transportation industry. A pre-recorded message was also delivered by CIHT President Martin Tugwell, who extended his thanks to the Qatar Group for its efforts over the past seven years.

Qatar Rail transport planning director Raimund Hanauer provided an overview of recent developments to the country's railway network including the opening of a new 'Red Line' last spring.

Vodafone resourcing manager Pam Naidoo explored strategies for conflict resolution before a break for dinner, which was followed by a discussion of projects that were 'highly commended' in the CIHT International Project Award category.

↑ Attendees enjoyed the festivities

Herve Etave of Arcadis Consulting Middle East presented on Qatar's major 'Orbital Highway Contract 2' project and Professor Kim Jraiw of the National Traffic Safety Committee shared his expertise on a road safety and sustainable transport management initiative.

CIHT Qatar Group thanked and presented awards to event sponsors Arcadis, BG&E, DCE, Fugro, Jacobs, Muhel, PTV, QDC and WSP.

Qatar Group chair Veronica Yu delivered a closing speech thanking the committee members and all of the evening's attendees.

Approved Training Providers scheme continues to grow

CIHT has welcomed two new companies to its Approved Training Providers scheme. The initiative was launched last year to point members towards high quality training and relevant CPD.

The latest companies to be approved are CCW Training Academy, based in Cardiff, and Paramics Microsimulation (Systra), based in Edinburgh. This means there are now six Approved Training Providers, with more on the way.

CCW offers a broad range of vocational training courses including team leading, project management, AutoCAD, environmental awareness, bid writing and health and safety.

Director Mike Tan said the company is delighted to become the first Approved Training Provider in Wales. "CPD training for CIHT professionals can offer new knowledge and expertise, and help them to develop their own personal career path."

Paramics Microsimulation's 'Discovery Paramics' courses provide training around use of the company's traffic modelling software, supporting professionals to design, evaluate and present transport solutions.

The firm's director Malcolm Calvert said: "Formal recognition from CIHT will give potential customers confidence in the standard and quality of training we provide."

Two existing Approved Training Providers – Road Safety GB and RTC Leadership & Coaching – are set to deliver training master classes at CIHT's Britannia Walk office this year. To find out more, visit their websites or email *john.hall@ciht.org.uk*

For more details about Approved Training Providers visit *ciht.org.uk/atp*

Young Professionals chair sets out ambitions

New chair of the Young Professionals Network Stephen Cooke is keen to ensure that emerging practitioners are able to have their voices heard and contribute ideas for taking the sector forwards.

Stephen – who is commercial and operations manager at Asphalt Group – became chair at the start of February after being inspired to get more involved in the Network at the Young Professionals Conference in Manchester in 2019.

"I was blown away by the conference," he said. "It really showed how young people can make a difference to the industry."

Stephen joined the transportation sector five years ago after spending 10 years as an accountant. "My route has been different to a lot of other professionals but my skills and experience have put me in good stead for what I do now," he said.

His current role with Asphalt Group involves liaising with clients to specify the most effective highway treatments and price and build schemes, and managing operational teams.

↑ Stephen Cooke

On the decision to take on the role of Young Professionals Network chair, he said: "I wanted to show I have something to give to the industry as well as CIHT. I would like to raise the voice of younger members and help to push their ideas forwards."

↑ Last year's Young Professionals Conference

Key issues facing the sector where young professionals have much to offer to the debate include tackling the climate emergency and bringing through emerging technologies, he said.

Stephen is planning for this year's Young Professionals Conference to involve even more opportunities for attendees to give input and feed back their own ideas for solutions to the sector's challenges. "I want to see if we can push something through that will really make a change within the industry," he said.

For more information about the Young Professionals Network visit *ciht.org.uk/ypn*

Climate focus for Spring Conference

Less than three weeks remain until CIHT welcomes delegates to its Spring Conference, where the issue of climate change and action required to address it are set to top the agenda.

Attendees will hear from the Committee on Climate Change's adaptation committee chair Baroness Brown of Cambridge who will discuss approaches to delivering a carbon neutral future.

There will also be a presentation from the Society of Motor Manufacturers & Traders president Dr George Gillespie, setting out priorities for the automotive industry.

CIHT Chief Executive Sue Percy said: "This conference will explore how we can work together to create a sustainable sector that will contribute to our net zero carbon commitments."

Also due to address the conference are a Minister from the Department for Transport, Highways England's chief engineer Mike Wilson and representatives of seven sub national transport bodies.

The event takes place on 1 April at City Road Conference Centre in London. For more information visit *ciht.org.uk/springconf*

Keith Madelin 1941 - 2019

Former county surveyor of Shropshire and professor of civil engineering at the University of Birmingham Keith Madelin FCIHT passed away on 30 December.

Keith enjoyed a successful career in local government for over 35 years before becoming an academic, spending most of his career in the West Midlands. He was awarded an OBE in 1994 for services to transportation.

His career began in 1960 with Staffordshire County Council and – after gaining an MSc in transportation and environmental planning – he then moved to the North East.

He was initially appointed to Gateshead County Borough Council before becoming chief assistant traffic engineer at Teesside County Borough in 1968, and was promoted to assistant borough engineer in 1970.

Following local government reorganisation, Keith became deputy county surveyor in 1973 with Cleveland County Council and returned to the West Midlands the following year as the Metropolitan County Council's deputy county surveyor.

From here, he was appointed county surveyor to Shropshire County Council – a post he held from 1982 to 1995.

During this period Keith was highways adviser to the Metropolitan & County Councils Association for 12 years and to the Transport Research Laboratory for four. He became a member of the Standing Committee on Highway Maintenance for the UK in 1984 and was responsible for the National Road Maintenance Condition Survey.

Keith was also a member and chairman of the National Highways & Utilities Committee and was primary author of the first Code of Practice for Highways Maintenance, published in 1983.

Keith became a Fellow of the CIHT in 1983. He was also a UK Member of the PIARC Road Management Committee from 1987 to 1999 and was named president of the County Surveyors Society in 1993.

Keith moved to the University of Birmingham as a lecturer in 1996 and, as professor of civil engineering, established railway research as a new topic for the university in 1998.

He led the creation of a multi disciplinary railway research centre at Birmingham and, in 2003, established the univeristy as the lead partner in a consortium of 12 research groups from seven universities known as Rail Research UK, which he directed.

After retirement in 2005 Keith became an active contributor and chairman of the Institution of Civil Engineers' West Midlands senior members group.

For 45 years, he was an active member of the community of Trinity Church Codsall.

↑ Keith Madelin

Keith is survived by his sons Peter and Stephen by his first wife Jill, who died in 2006. He leaves his wife Ruth, step daughter Mary and step son James.

Former colleagues knew Keith as a charming individual, a good communicator and a solid engineer, who was forward thinking and ready to push the envelope in advancing technologies for transportation.

Thank you to John Parry for his help with this tribute.

National events – CIHT and others

For further event listings, visit *ciht.org.uk/events*

Smart transport conference
17 March, London
Industry leaders and policy makers will debate emerging solutions in smart mobility for accessible and sustainable transport.
smarttransport.co.uk

South West highways conference
18 March, Swindon
Opportunities for local highway authorities to achieve carbon neutrality and other environmental benefits will be considered.
landor.co.uk/swha/2020

Northern transport forum
24 March, Leeds
Hear about latest plans for transport schemes in the north and how they can be delivered to maximise wider development opportunities.
waterfrontconferencecompany.com

↑ **Electric vehicle charging**

Road to zero conference
24 March, London
Developing greener roads for the future is the theme of this event, exploring ambitions for all cars and vans to be zero emission by 2050.
governmentevents.co.uk

UK rail summit
24 March, London
Major focus will be placed on the recommendations of the Williams Rail Review and future investment.
transporttimes.co.uk

Public health and sustainable transport summit
27 March, Bristol
Examining the delivery of high quality sustainable transport choices to enable healthier lifestyles.
landor.co.uk/transporthealth/2020

'Metroisation' of the railways
30 March, London
Sir Peter Hendy of Network Rail and CIHT President Martin Tugwell will address this event exploring opportunities to run more frequent rail services.
connectedcities.co.uk

Future for UK ports
31 March, London
Focusing on international trade, technology and infrastructure in the context of Brexit and the impact of moves to develop free ports.
weetf.co.uk

CIHT Spring Conference
1 April, 99 City Road Conference Centre, London, 9am
Setting out what changes the sector will need to make to deliver sustainable growth and meet the climate change challenge.
ciht.org.uk

↑ **London roadworks** AL

Future of local roads
21 April, London
Stakeholders and policymakers will examine the future funding and development of local roads.
weetf.co.uk

Ports development conference
29 April, London
Major ports from across Europe will showcase their future development plans and the role they play in driving economic regeneration and growth.
built-environment-networking.com

Innovation and technology in transport
13 - 14 May, Farnborough
This exhibition and conference will feature thought leadership sessions aiming to provoke ideas and help to shape the future of transport.
itthub.co.uk

Transport and logistics event
20 May, Coventry
Professionals involved in the operation of road transport fleets will hear from industry leaders on the future of the sector.
microliseconference.com

International events

Asphalt and bitumen conference
12 - 14 May, Madrid
Considering how road materials need to be ready for future mobility.
eecongress2020.org

ITS European Congress
18 - 21 May, Lisbon
This event will examine intelligent transport systems as a 'game changer' in addressing mobility, health and environmental issues.
itseuropeancongress.com

↑ **Travel in Lisbon**
DEENSEL – FLICKR

Transport innovation for sustainable development
27 - 29 May, Leipzig
A forum to discuss future transport policy with ministers, chief executives, thought leaders and academia from across the world.
itf-oecd.org

CIHT Region events

Members can attend events in any region. For full listings visit *ciht.org.uk/events*

East Midlands

Regional papers competition
24 March, Hallmark Hotel, Midland Road, Derby, 6pm
Young professionals will compete to deliver the best presentation on a project, piece of research or transport issue following an AGM.
ciht.org.uk/em

Scotland

An evening with Uber
24 March, CFINE, Poynernook Road, Aberdeen, 5.30pm
Matt Eastwood of ride hailing firm Uber will speak about the company's operations in Glasgow and Edinburgh.
ciht.org.uk/Scotland

↑ **Ride hailing** UBER

North East & Cumbria

Regional papers competition
26 March, Northern Stage, Barras Bridge, Newcastle, 5.45pm
Young professionals will each have 10 minutes to present on a transport topic of their choice.
ciht.org.uk/ne

South West

Low carbon transport planning
26 March, Steam Museum, Fire Fly Avenue, Swindon, 5.30pm
Exploring how planning can predict and respond to demand while reducing environmental impacts.
ciht.org.uk/sw

North West

Climate change emergency
27 March, Brian Statham Way, Old Trafford, Manchester, 9.30am
Increase your knowledge of how climate change is impacting on transport and what organisations are doing to reduce emissions.
ciht.org.uk/nw

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w: **www.ciht.org.uk/springconf** e: **conferences@ciht.org.uk**

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