

# The Review

Celebrating four decades of policy shaping projects

**Spotlight**

Significant projects that have helped shape government policy across the globe.

**Urban Planning**

A complete streets approach to address health issues and help make cities more liveable.

**Major Developments**

How new transport schemes can help deliver more homes and jobs.

# Welcome

We publish this edition of *the Review* not long after the conclusion of the UK's referendum on membership to the EU. While much of the commentary regarding this outcome has focused on change and uncertainty, we at Steer Davies Gleave are not losing sight of the ongoing role of transport and the need to find effective solutions for communities, investors, operators and governments. Without question the UK, Europe and North America face common issues. As a multinational company with deep European heritage, our approach is to recognise the scale and complexity of these challenges and to utilise the full breadth of our global knowledge base to provide the very best advice to all of our clients. This way of working, as an integrated multinational company, is one of our core values and one that will continue as we grow and expand our European operations.



**Hugh Jones**  
CEO

## Sharon Daly Managing Director



We are delighted to announce the appointment of Sharon Daly as Managing Director for our UK business. Sharon is an Australian-born management consultant

specialising in transport. An accountant by training, her career began in government working for the Department for Transport in South Australia, where she focused on forward investment strategies. She moved to the UK in 2000, taking a leading role in the development of transport strategy and planning at SDG.

Her career has spanned a range of high profile secondment positions, including roles at the Strategic Rail Authority, Merseytravel, West of England Local Enterprise Partnership, Cambridgeshire County Council, and London Underground Limited. Recent highlights

include the study Sharon led advising the National Infrastructure Commission on the case for Crossrail 2, and the TWA work she directed for Bank Station Capacity Upgrade which went unopposed at public inquiry.

At Steer Davies Gleave she has been a pivotal senior member of management, leading the UK Planning team's success in growing revenues and expanding its client base. Now in her new role as Managing Director, her remit will be to set out a vision for Steer Davies Gleave's UK business and to ensure its continuing growth and success.

Sharon strongly believes that transport plays a fundamental role in shaping our communities and is passionate about ensuring transport has a positive impact on our living spaces, environment and life opportunities wherever we live.

## New faces



**Philip Rust**  
Director

Philip Rust joins our London-based Planning team. With over 33 years of experience in transport and development planning, he has managed many mixed use regeneration schemes within the public and private sectors. He also has a wealth of experience in the development of transport accessibility strategies and the design of new highway infrastructure.



**Anita Mauchan**  
Director

Anita rejoins us after seven years of working for a range of clients in the field of demand forecasting and policy advice. She joins our Leeds office as a Director in the Planning team. She is a specialist in directing traffic and appraisal studies for major infrastructure projects, advising regional and national governments, concessionaires, private sector clients and project lenders including the World Bank.



**Russell Yell**  
Associate Director

Russell joins our UK Planning team as an Associate Director. He has a wealth of experience advising on transport planning and urban mobility issues and has led the delivery of innovative and smart solutions to public and private sector clients internationally. At SDG he will further develop our Intelligent Mobility and Big Data insights offer.



**Alberto Preti**  
Associate

Alberto Preti, who joins our Italian office in Bologna as an Associate, is an economist with expertise in the management and coordination of complex national and international transport projects. He also has a deep understanding and experience with EU funding in transport.



**Carl Pittam**  
Associate

Carl joins us as an Associate based in our London Planning team, to develop our behaviour change, cycling, walking and urban realm capabilities. Carl played an influential role in the development of walking and cycling infrastructure for the London 2012 Olympic Games. In recognition of his role, he was awarded the Sustainability Ambassador Award by LOCOG.

## Company updates

### Smart and sustainable mobility in Europe

Steer Davies Gleave was present at this year's TEN-T Days 2016, an event that brings together stakeholders who play a key role in delivering the efficient transport network that Europe needs: EU Ministers, Members of the European Parliament, the European Commission, the TEN-T Coordinators, the European Investment Bank, Ministers from Europe's neighbouring countries and the whole TEN-T stakeholders community.

Jon Peters, Associate at SDG, presented the emerging findings of a study undertaken for the European Commission aimed at investigating possible solutions that could support the development of alternative fuel infrastructure along EU road corridors. He discussed – along with experts from the European Commission and the European Investment Bank – financial instruments that could help mitigate the existing financial barriers (amongst other barriers such as technical or regulatory) that currently limit investment in this area.

We also addressed the European Parliament Transport and Tourism Committee this spring to present an assessment of state of the art developments and future perspectives of self-driving vehicles. The study's recommendations contribute to the ongoing debate on policy actions and strategies taken at a European level on connected and automated vehicles.

### SDG ranked in the top 20 companies for graduates to work for

Steer Davies Gleave has been continuously recognised by careers website The Job Crowd, as one of the top 100 companies in the UK for graduates to work for. The 2016/17 results proved no different, with the company being shortlisted for 'Best Consultancy for Graduates to work for'. We also ranked in the Top 20 of the general list, our highest position yet, placing us alongside high profile names such as Microsoft, Asda and Volkswagen.

### Looking to move?

If you are considering your future and are looking for somewhere to make a real difference, Steer Davies Gleave has much to offer. The firm continues to grow in Europe, Asia and the Americas.

To find out about the opportunities we have to suit you, visit our website:

[www.steerdaviesgleave.com/careers](http://www.steerdaviesgleave.com/careers)

### Rugby World Cup journey planner wins an Excellence award

We were awarded the 'Excellence in Travel Information and Marketing' award in this year's edition of the London Transport Awards. The prestigious ceremony recognises companies and individuals who are leading the way in making a real difference to transport across the city of London. SDG was recognised for the design and development of the Rugby World Cup Journey Planner, commissioned by England Rugby 2015 to support the transport operations and communication activities of the Rugby World Cup 2015.

The tournament, deemed the most successful Rugby World Cup to date, used 13 venues spread across 11 different cities and saw an attendance of over 2.5 million fans. Due to its nature, the normal transport operations had to be changed at each venue. This involved widespread alterations to car parking, public transport and park and ride services. Given this complexity, the event organiser, England Rugby 2015, recognised the benefit in developing a World Cup specific journey planner that would help inform users of their travel options in the build-up to the tournament, and provide travel guidance on match days.

The journey planner was well used throughout the event. Around 500,000 users generated 600,000 journey plans. Surveys conducted by England Rugby 2015 after each match showed how 90% of the users consistently rated the journey planner as being useful, very useful or extremely useful.

### Steer Davies Gleave recognised as Leading Technical Advisor

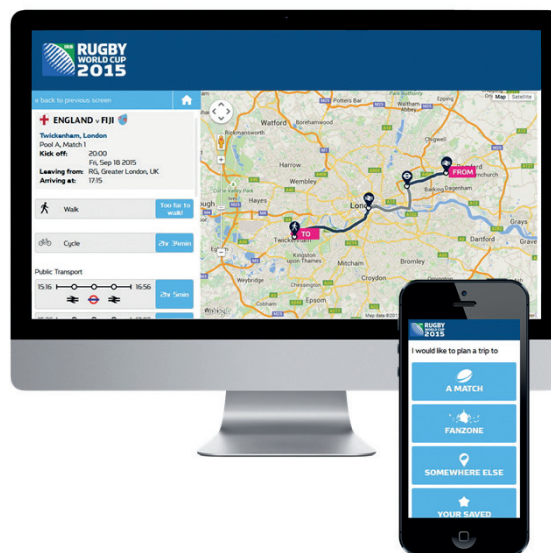
The Infra Deals project finance and advisory league tables, for all deals completed in Q1 2016, were published earlier this month. The league tables show Steer Davies Gleave as number three by deal value in the list of global technical advisors. We provided support to three of their 'notable deals':

- M7 Airport Link, Brisbane, Australia (Acquirers Traffic Advisor)
- Pacifico 1: Colombia (SPV Traffic Advisor)
- SH288: Houston, Texas (SPV Traffic Advisor)

We were also involved in other important projects within the 13 closed deals, covering a total investment of more than \$2.5bn. Some of those projects include:

- Canberra Light Rail (SPV Technical Advisor)
- PR-22, San Juan, Puerto Rico (Owners Traffic Advisor)
- Mestre By-Pass, Italy (SPV Traffic and Technical Advisor)

Well known already as the leading traffic and revenue advisor for transport projects across the world, we are now building our portfolio – and reputation – in providing technical support. Our recent work includes light rail in Australia and Canada, roads in Ireland (ie. M11 and N25), locks and waterways in Belgium and airports in the United Kingdom and elsewhere.



Awarded Rugby World Cup journey planner

# Event management practice to reduce capacity constraints

**Used by millions of passengers per day, UK public transport systems are in some instances facing major capacity constraints. With demand forecast to rise even further, they might soon reach maximum capacities. Large events add to the demand on already busy networks and therefore need to be properly managed. There are many useful lessons to be learnt from this.**

By Simon Hall

Major events such as conventions, sport competitions and music concerts can bring together at specific times tens of thousands of people who need to move safely, adding to the demand on an already busy network. Our experience of managing these type of events has given us insights into best practice on how to apply event management practices to station operations to allow for public transport systems to run more efficiently during times of disruption.

In 2015, for example, SDG seconded a team to manage the transport operation at Twickenham Stadium in London for the Rugby World Cup. With ten matches at the stadium and a capacity of 80,000 spectators, the team designed and managed a transport operation covering over two million trips (audience to the stadium and the unticketed demand to the fanzone).

Considerable planning ensured that the capacity of Twickenham railway station was not exceeded and safety standards were met at all times. Even with late kick-offs and matches finishing after 10pm, all spectators were able to return home thanks to the provision of additional capacity at nearby National Rail and London Underground stations, as well as supplementary bus services. In addition, an enhanced communications strategy, which included a web and mobile-based journey planner,



temporary wayfinding signage and sufficient stewards, ensured that fans were aware of the transport options available to them and could plan alternatives accordingly.

Following the opening match of the tournament, a serious incident occurred at Twickenham station. A person accidentally fell onto the rail tracks and the station closed for over 45 minutes at peak egress while the emergency services acted. Trains were delayed for about an hour after the incident, which certainly caused difficulties with considerable congestion. However, thanks to the comprehensive contingency planning which took place before the start of the tournament, an effective strategy was quickly put into place to manage spectators so that they were able to take alternative routes, mitigating the disruption. Without this planning and the close liaison between the Stadium Control Room staff and TfL's Control Centre, the situation would have been much worse, with many spectators unlikely to have found a way home that evening.

What happened that night, and how quickly event operators were able to react to it, show that detailed planning and effective management can help mitigate the impact of the incident on passengers. Past experience from large scale events can help to inform operational decisions for the future. By quantifying the extent of changes

in user behaviour, such as using a different station or mode of transport, the extent of the impact on the site of the disruption and surrounding areas could be minimised. As part of the planning for the Rugby World Cup, SDG built a tool (TRACME) to forecast passenger demand at the stations likely to be affected by the tournament. This tool helped transport operators plan for additional capacity and identify when the capacity would be required before and after matches. Looking ahead, with today's technology improving at a rapid rate, such demand forecasting tools could be improved with real time data, gathered from mobile phones or ticket gatelines to help operators implement appropriate management strategies and contingency plans.

SDG's new Associate Director Russell Yell (see page 2) will be working with our Sports and Major Events team to develop this integration further – ensuring that frustrating transport delays are reduced and as much information as possible is provided to the travelling customer.



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# Europe's aviation strategy, what's next?

**Some significant challenges lie ahead for the European aviation industry. In order to try and address these, the European Commission plans to negotiate an ambitious package of external aviation agreements.**

By Mark Scott

In December 2015, the European Commission published its aviation strategy. The document sets out how the Commission intends to deal with the main challenges facing the European aviation industry. As well as addressing internal challenges, including airport capacity constraints, and maintaining high standards in areas such as safety and passenger rights, the strategy aims to maintain Europe's place as a leading player in the international aviation market.

A key part of achieving the last objective, is negotiating external aviation agreements with non-European Union countries, with the intention of:

- promoting liberalisation of services;
- lowering prices for consumers;
- providing business opportunities for European companies; and
- creating a clear regulatory framework for the aviation industry.

The EU already has external agreements with the US and Canada, among others, and intends to start negotiating new agreements with several countries including the Association of Southeast Asian Nations<sup>1</sup> (ASEAN), Turkey, China and the Gulf Cooperation Council States<sup>2</sup> (GCC). By seeking external agreements with these nations, the Commission is recognising their importance to the future of the aviation industry.

Europe, after North America, has traditionally been one of the world's leading aviation regions, but in recent years the industry's centre of gravity has shifted east. Dubai airport recently surpassed London Heathrow as the world's busiest international



passenger airport, and by offering lower fares, the major Gulf carriers (Emirates, Etihad and Qatar Airways) have taken significant market share from European carriers on routes between Europe and Asia.

Many within the European aviation industry consider the Gulf carriers to be unfair competition; it is alleged that their ability to offer lower prices than European carriers has been enabled by large state subsidies and favourable terms of business from the airports in the Gulf. Both these claims are denied by the carriers themselves.

Although the strategy document<sup>3</sup> does not mention the Gulf carriers explicitly, it does note the importance of 'guaranteeing a level playing field', or in other words, an environment in which all airlines follow the same rules and have an equal ability to compete.

By offering more liberal air transport agreements, which would allow the GCC States' airlines greater access to the European market, the Commission hopes it will be able to negotiate fair competition clauses within the agreements to ensure that EU carriers are able to compete on an equal basis. These fair competition clauses would seek to establish transparent market conditions based on a clear regulatory framework.

Despite the planned fair competition clauses in the EU's new external agreements, market liberalisation means that EU airlines will face increasing competition from non-European airlines with lower costs as well as, in the case of the Gulf carriers, a geographical advantage. This is something the Commission will have to consider and weigh against the benefits of increased business opportunities for European companies and lower fares for European consumers.

Although the European aviation industry will continue to face challenges from Asia, well-designed external aviation agreements containing fair competition clauses should lead to better services for European consumers, and boost the European airline industry, by creating new opportunities within a clear and transparent regulatory framework.



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<sup>1</sup> Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

<sup>2</sup> Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates.

<sup>3</sup> [http://europa.eu/rapid/press-release\\_IP-15-6144\\_en.htm](http://europa.eu/rapid/press-release_IP-15-6144_en.htm)

# The image of the city

**Many cities have invested in the creation of map databases to support the delivery of wayfinding systems. But, why would a city commit to such investment and effort, considering the availability of free mobile map services and widespread Open Data?**

By Juan Pablo Rioseco

American urban planner Kevin A. Lynch coined the term wayfinding in his most famous work “The Image of the City” (1960). The book reports that users understand their surroundings in consistent and predictable ways, forming mental maps with five elements: paths, edges, districts, nodes and landmarks. Nowadays city wayfinding systems across the world – often known as ‘legible city’ projects, named after the original Bristol Legible City initiative – rely heavily on bespoke maps to support the creation of mental maps.

As demonstrated in cities such as London, New York and Toronto, effective mapping requires editing vast amounts of data down to a manageable amount of information. Building stakeholder and public consensus around a map style suitable to display street names, destinations and transit stops while still revealing the unique character of a city and its neighbourhoods is not an easy task. There is never a one-size-fits-all solution.

## Maps for walking

People walking through a city can feel at their most vulnerable in unfamiliar environments. Pedestrians are more exposed to the elements and may be unwilling to explore beyond their comfort zone or commit to a long walk. The availability of on-street pedestrian maps caters for the informational needs of people who have a destination in mind and of those in need of general orientation and reassurance.

Evidence gathered through Steer Davies Gleave’s evaluation of the Legible London programme in the UK<sup>1</sup> confirms that a



© Toronto Transit Commission

consistent network of maps and signs reassures pedestrians and increases their confidence to explore. Additionally, design mechanisms such as the inclusion of walking time – as opposed to distance in meters – reduces the perception of the time required to make a journey on foot.

Walking is key to the success of multi-modal networks. Purposeful walking is required at both ends of a journey and in interchange environments, including those integrated into the urban realm. Effective city wayfinding maps should support visitor exploration and discovery but also enable residents to connect seamlessly to and from transit, cycle hire or private vehicles.

## Maps as assets

The benefits of installing high-quality (albeit costly) on-street pedestrian wayfinding signs can be amplified by the implementation of consistent mapping in existing infrastructure at marginal additional cost.

Investing in a robust map asset database will benefit the delivery of a wayfinding programme and would also benefit third parties such as transit agencies, operators or private companies that in return will deliver city wayfinding information through their own information and signage systems.

Steer Davies Gleave’s TO360 wayfinding pilot implementation for the City of Toronto initially consisted of 20 new maps and directional signs in the Financial District. This relatively small scheme was intensified thanks to a joint effort with TTC (Toronto Transit Commission) that led implementation of new

bus shelters posters combining walking maps with local transit information. Furthermore, wayfinding maps were installed in Union Station to welcome passengers arriving from the airport to downtown Toronto via a third-party map-sharing agreement with Union Pearson Express.

The consolidation of mapping assets in a single database allows the authorities to retain control over the map content and enables the production of printed and online products. Once the database is set, data can be made available to city departments or third parties to produce their own map products. These can become additional delivery vehicles to maximise the benefits and awareness of a city wayfinding initiative without incurring additional infrastructure cost.

Steer Davies Gleave is currently supporting the cities of Toronto and Bologna in the delivery of pedestrian wayfinding strategies.



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<sup>1</sup> <http://content.tfl.gov.uk/legible-london-evaluation-summary.pdf>

# Diversity in design

The science of design can be applied globally. Steer Davies Gleave's Design for Movement team has a 30-year track record of creating applied design in the transport sector. However, here we look at non-transport related projects that use our best practice design principles, and some common themes that span all sectors.

By James Brown

We combine our understanding of human experience, perception and behaviour to deliver innovative and user-centred design. This approach helps make places understandable, accessible and enjoyable for all. The core areas that define our design practice are information, environment and identity. These pillars can be applied across all projects.

Over recent months, we have been hard at work on a host of projects, ranging from developing wayfinding for a central London university to a visual identity and signage system for a cemetery and crematorium in Luton.

## Regent's University London (UK)

Nestled in the heart of Regent's Park, Regent's University London is taking its first steps towards the creation of a new wayfinding system. The University's core objective is to develop a system that will allow students, staff and visitors to navigate the site easily while projecting an image that is both professional and consistent with its brand values.

We advocate that wayfinding should consider the whole user journey from origin to destination. Consequently, our objective for Regent's University London is to combine this approach while creating consistency across all wayfinding touch points.

The first phase of the project included a site-wide review of all existing signs and wayfinding. In addition, with the involvement of stakeholders, we established the key objectives and aspirations for the system. This is important, as consultation with stakeholders, although often underestimated,



Proposed design for the Vale Cemetery and Crematorium's bereavement pack

can provide valuable insight helping to create a solid foundation from which to develop and grow an offer.

Our initial output has been a series of recommendations and opportunities with assigned priorities that will allow the University to meet its goals. Phase two, concept design, is due to start later this year.

## The Vale Cemetery and Crematorium (UK)

The Vale, located on the outskirts of Luton, is undergoing a transformation. We were tasked with addressing two main issues: to improve signage and information provision across the site, and to communicate a clear, professional and approachable image. The purpose is to improve the visitor experience while promoting the site as a valuable alternative to others in the area.

To many it may seem odd to develop a visual identity for such a service, but visual identity is more than just a well-designed logo, it is about caring about your offer at every level and in every interaction with your users.

Our innovative approach to the project led us to the development of a new visual identity, which uses the concept of a window to symbolise openness. The new identity is light, fresh and dynamic, values that have been applied across the wayfinding and signage system. The project is due to be implemented later in 2016.

Although these projects deviate from our portfolio of transport-related projects, the design process is managed as it would for any transport project. The key is to coordinate those involved to ensure the design process

delivers the outcomes required by the client. In order to achieve this, a number of things should be taken into account:

- Clearly identify the purpose and goal of the project at the outset.
- Prepare a design brief outlining the project's aims, budget, timetable and any legal, technical or other constraints on developing the design.
- Carry out research both before and during the project.
- Monitor the process as it develops. If the project deviates from the brief, investigate and make sure it is for a good reason. The design process is not a linear one and its organic nature allows for the development of innovative ideas.
- When the process is finished, make sure you gather as much feedback as possible. This will help you to run future design projects even more smoothly and apply learning to other projects.

The skills and knowledge within our Design for Movement team can be applied effectively to diverse areas. For instance, our in-depth knowledge of transport information systems and user behaviour could be used to improve user experience within hospitals, through the simplification of information in what can be a stressful environment, or to improve the online booking systems of events. The only limit is our imaginations.



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**INTERVIEW**  
**VICTORIA HILLS**



## Redeveloping UK's biggest new development

**Unless you happen to be looking for a second hand car, the chances are you have never been to Old Oak – one of London's most unknown, least celebrated quarters. But that is something that Victoria Hills, the CEO of the Old Oak and Park Royal Development Corporation (OPDC), is determined to change.**

**Interview with Victoria Hills, CEO of OPDC**

Victoria Hills is overseeing the redevelopment of 650 hectares in this forgotten corner of west London straddling the three boroughs of Hammersmith & Fulham, Brent and Ealing. She has been tasked with delivering 25,000 new homes and 65,000 jobs in what will be the biggest new development in the UK since the 2012 Olympics and probably the most ambitious project of its kind anywhere in Europe.

This would be a daunting prospect for anyone, but perhaps even more so for a young woman entering the very male, notoriously macho world of property development. Yet Victoria Hills is already a veteran of the equally male-dominated world of transport policy, having served as Head of Transport at the Greater London Authority.

She is not fazed by the challenge. In fact, she believes there is some advantage of being a woman in a traditionally male world:

*'There are some who see a woman, a youngish woman, and they underestimate you' she says. 'Yet, when I prove myself and can get things done, it's a different story.'*

The development hinges on the creation of a rail superhub at the only point where the Elizabeth Line (formerly Crossrail) meets HS2. The meeting point will be the site of a new super-station on the scale of Waterloo, instantly promoting the area from one of the least to one of the most connected in the capital, but the Corporation's ambitious transport planning will go far beyond the traditional modes of road and rail. Cycling and walking will be deeply integrated as equals to other transport modes, and kerbside parking will be kept to a minimum.

For someone who has wrestled with the difficulties of reshaping transport among the complexities of London's road and rail network, the relatively blank sheet presented by Old Oak and Park Royal is the opportunity of a lifetime: *'We're starting from scratch. Instead of retrofitting, we can get everything right from the start. We aren't just building houses, we are making a place, a place people*

*will want to live in and visit and which will be rewarding in every way.'*

The resulting development won't just be a great place to live and work, she believes, but a world class example of the 'circular economy' where renewables, recycling and waste-reduction are built into the design, making it less wasteful, more pleasant to be in and also, crucially, a natural centre of expertise in the technologies of green urban development. This will attract investment and knowledge and it will create a virtuous circle that sustains and builds on that expertise with the jobs and economic benefits that go with it.

So if you are in the market for a second hand car in the next few years, perhaps Old Oak will not be a natural destination. But there is a good chance that it will be on your map for many other reasons. After all, if Victoria and her team fulfil their ambitions, the idea of owning a car at all may seem as quaint as a horse and cart in the ultra-modern, ultra-green new town of Old Oak and Park Royal.

Find out more information about Old Oak and Park Development Corporation by visiting [www.london.gov.uk/opdc](http://www.london.gov.uk/opdc).





# Transport, the biggest challenge for London's Mayor?

**Reminders of London's past Mayor, Boris Johnson, are clear to see – the new Routemaster, Cycle Hire and Cycle Superhighways. The 'cycling revolution' appears to have been successful, with cycling numbers increasing by 25% during his term. However, with a housing crisis and declining air quality across the city, is transport still the new Mayor's biggest challenge, or part of the solution?**

By **Hannah Brown**

We all know that London is growing and at an unprecedented rate. The growth, equivalent to the cities of Birmingham and Glasgow moving to London by 2040, will put increasing pressure on our infrastructure and bring about an increased demand for housing in an already stretched market. As well as growing, London's population is also ageing rapidly. By 2035 experts predict there will be 70% more over 80 year olds living in London than currently<sup>1</sup>.

This population growth, in conjunction with increasing demand for goods and services, has resulted in a decline in London's air quality. It is now estimated that up to 9,400 people each year are dying as a direct impact of poor air quality<sup>2</sup>.

Sadiq Khan, London's new mayor, therefore has a complex and difficult challenge ahead of him. At a time when government funding is declining and a fares freeze is promised, without a change in approach, the money available to invest in new infrastructure schemes will be constrained.

Capturing land value uplift when designing new transport schemes such as Crossrail 2, through the use of the Mayoral Development Corporations or the New Towns Act for example, could enable additional funding to be generated. This money would support the transport scheme that would unlock the development (up to 200,000 homes in the case of Crossrail 2) and help contribute to the provision of much-needed affordable housing.

Implementing the Ultra-Low Emission Zone will provide the stick for businesses to think differently about their deliveries and the type of vehicles used, as well as influencing staff travel. However, more needs to be done to reduce the emissions associated with the transport of goods. Raising awareness of the environmental issues and potential measures to overcome them, for example through delivery and servicing plans, could help provide the answer.

It would be unrealistic to imagine that four years is enough time to solve these issues, but some innovative thinking within a cohesive strategy, coupled with investment in key areas, could allow transport to be the solution to the challenges of London's growth.



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## Project updates

### Urban transit in the North

In 2015, the Blackpool and Fleetwood Tramway had its most successful year since it reopened in 2012 after a major system-wide renovation. In July Blackpool Borough Council made an application for a Transport and Works Act Order to extend the tramway from the Promenade to Blackpool North Station, allowing direct tram interchange with national rail services for the first time since 1936. SDG has been providing support to Blackpool Borough Council for more than fifteen years. We developed the business cases which secured funding for the new vehicles, renewed infrastructure and new depot which formed the successful 2012 upgrade. Between 2011 and 2013, we were transport planning advisor for the EU Sintropher-funded Fylde Coast Transport Study, which led to the identification of the Blackpool North Extension. More recently, we prepared the business case which in April of this year, secured conditional funding approval for the scheme from Transport for Lancashire. We continue to advise Blackpool Borough Council on the scheme.

### Stations in the North

On 19 June, Kirkstall Forge Station opened, our third West Yorkshire rail project successfully implemented this year. SDG prepared the business cases which secured funding for Kirkstall Forge and Apperley Bridge new stations and for the Leeds Station Southern Entrance.

### Supporting bonds underwriters in the financing of the Mestre bypass, Italy

Steer Davies Gleave supported the A3 rating assigned by Moodys to the financing of the Mestre bypass motorway – a toll road bypassing the city of Venice in northern Italy. The concession holder Concessioni Autostradali Venete (CAV) is the first issuer in Italy to benefit from the Project Bond Credit Enhancement Initiative (PBCE) facility. SDG has been advising the bond underwriters (Banca IMI, BNP Paribas, RBS, SocGen and UniCredit) as technical and traffic advisor. The rating was assigned to the EUR 830m senior secured amortising bonds that will be issued in March by CAV. The proceeds of the bonds will be used to refinance CAV's existing indebtedness linked to the EUR 1bn construction of the Mestre bypass. Since the PBCE launched in 2014, SDG has successfully acted as Lenders' Technical Advisor for the A11 Motorway in Belgium and the N25 New Ross Bypass in Ireland where the EIB has provided guarantees.

<sup>1</sup> Ageing London. Mayor's Design Advisory Group, Mayor of London, 2016  
<sup>2</sup> Understanding the Health Impacts of Air Pollution in London, King's College London, 2015

# How is London going to grow?

London's population continues to grow and is expected to reach 10 million within the next 15 years, raising questions on how the capital will cope with such vast numbers.

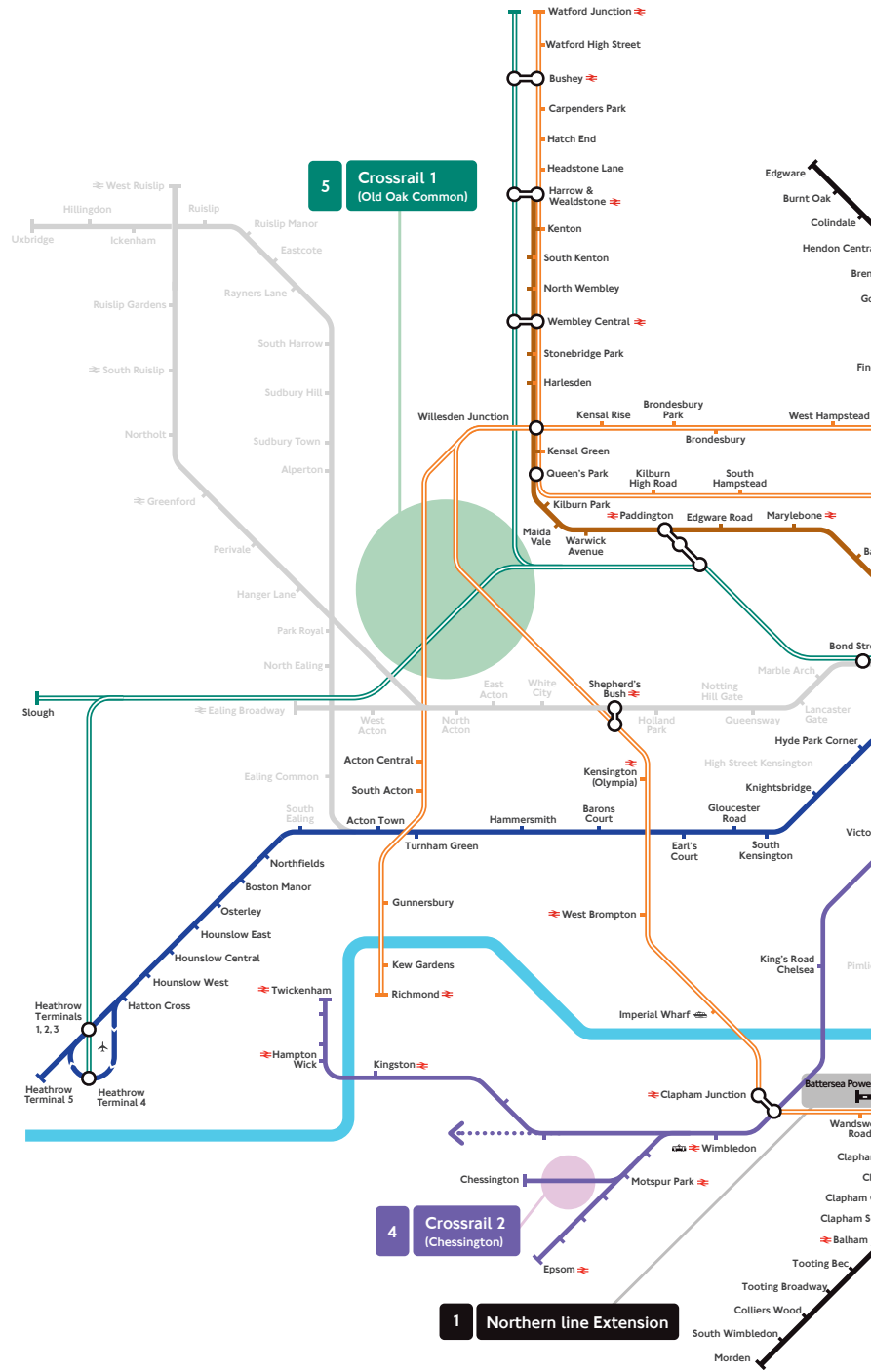
By David Bowers and Adrian Cole

This population increase will create many significant changes to the city and will put more pressure on planning and highways departments. With one to two million new residents expected, there will be a need to provide 49,000 new homes per year and a requirement for more schools, hospitals and other social infrastructure and utilities to serve the new residents. The 1.4 million expected new jobs will require the development of more office and retail space. To help deliver these changes there needs to be:

- Better use of existing public transport infrastructure.
- New and enhanced transport capacity.
- Better use of land, targeting growth on more accessible locations.

The GLA and TfL are progressing several major transport infrastructure schemes to support this planned growth and Steer Davies Gleave has been heavily involved in their development.

On the map, we reference the planned new transport schemes and how they can help deliver more homes and jobs at much higher densities than previous expansions of the city. They will help make efficient use of land - although compromises may be needed in its reallocation. The new developments will also generate new car trips which could, if not managed properly, lead to increased congestion. All this means that there are many issues to consider when helping London to grow.



### 1 Northern Line Extension

Works are well underway for this scheme which will revolutionise transport access to Battersea Power Station and the wider Vauxhall Nine Elms Battersea Opportunity Area. The funding regime for this £1 billion scheme is seen as a model of using new developments to pay for new infrastructure.

### 2 London Overground

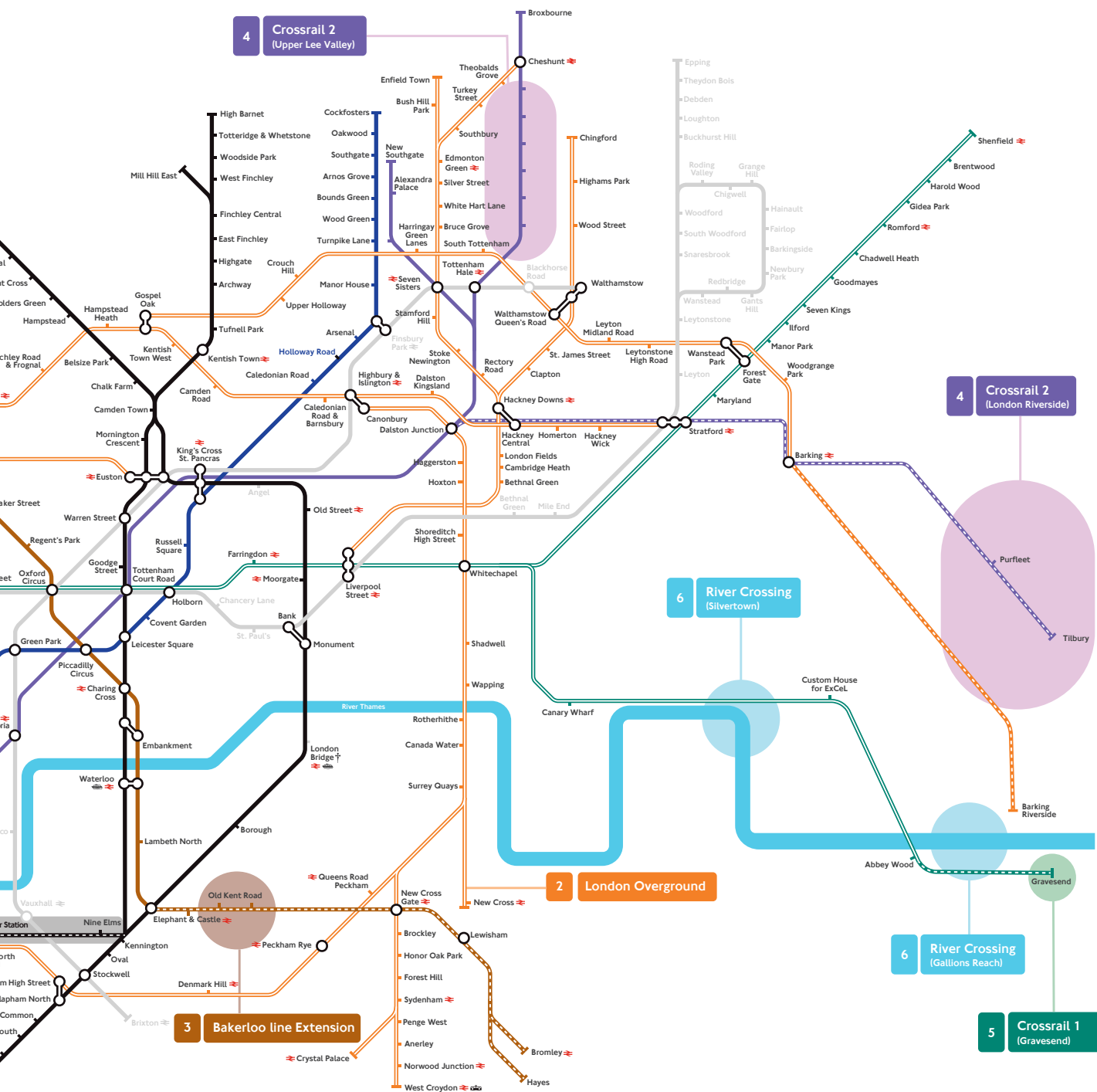
The introduction of London Overground has revitalised stations and their surroundings. TfL is considering expanding the Overground network in south London to improve local connections and access to the centre.

### 3 Bakerloo Line Extension

Currently the least used Underground line through central London, the Bakerloo line extension south-east from Elephant & Castle would help make best use of this line's capacity. The new route could go via the Old Kent Road to Lewisham and then potentially into the outer suburbs and Bromley.

### 4 Crossrail 2

This £27 billion scheme will link south-west and north-east London with up to 30 trains per hour, each capable of carrying up to 1,500 passengers.



**Chessington** Beyond the tunnelled section from Wimbledon to Angel, Crossrail 2 services will run on the national rail network. Increasing the speed and frequency of trains to central London would help deliver denser residential developments around Chessington.

**Upper Lee Valley** Reallocating land from industrial to residential use near the proposed Crossrail 2 stations would enable the provision of up to 75,000 new homes.

**London Riverside** A Crossrail 2 eastern branch would transform access through the London Riverside development area, providing the impetus for the construction of large new developments.

**5 Crossrail 1 (Elizabeth Line)**

**Extension to Gravesend** Crossrail 1 will transform east-west transport links through central London. Extending the alignment south-east from Abbey Wood towards Gravesend would help improve journey times from these areas.

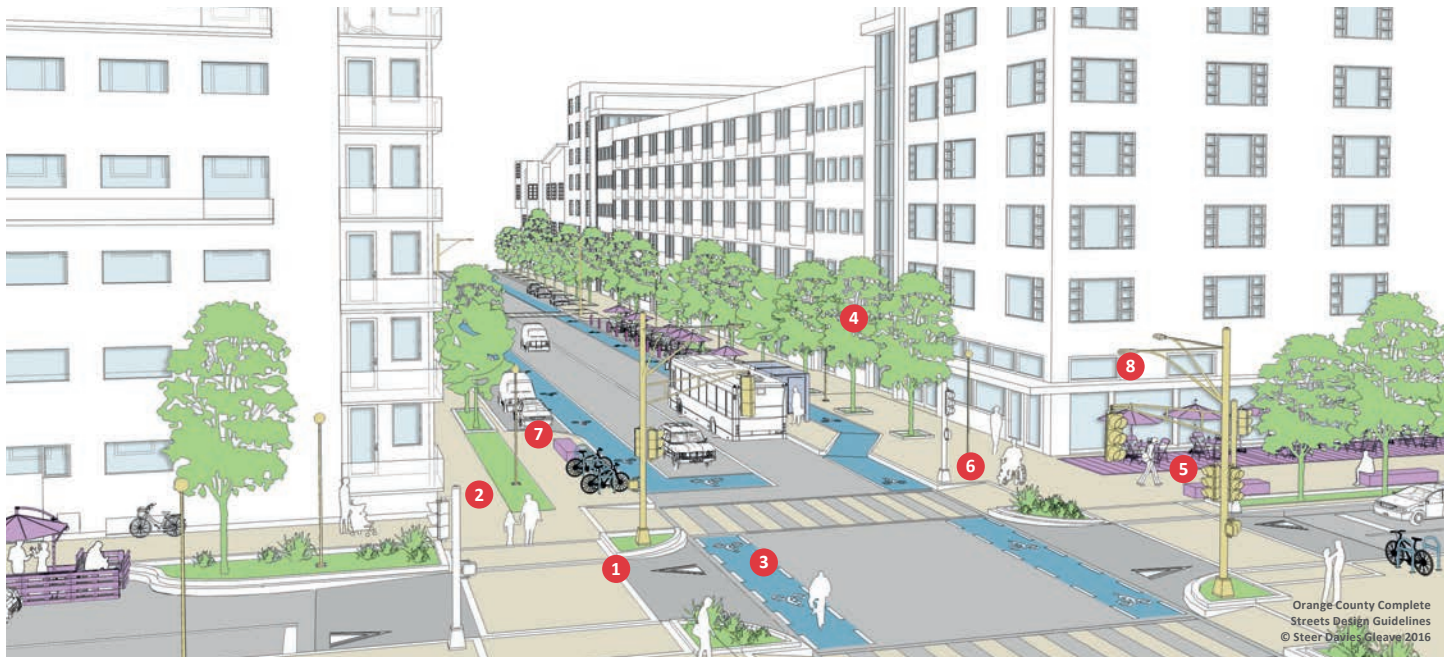
**Old Oak Common** Crossrail and HS2 will both have a station at Old Oak Common. This interchange will provide the springboard for major regeneration of the area, with 25,000 homes and 65,000 jobs expected (for more information refer to Victoria Hills' interview on page 8).

**6 River Crossings**

TfL is considering a range of options (such as a new tunnel at Silvertown and new bridges east of Woolwich and near Belvedere) to improve cross-river links and to reduce congestion at the Blackwall and Rotherhithe tunnels.

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## Complete streets, a route to healthier lives

**Many cities face critical health issues, with poor air quality killing around 5.5 million people worldwide annually. In London, it is estimated that around 9,400 people die yearly due to air pollution. Taking a 'complete streets' approach can help address health issues and also make our cities more liveable.**

By Richard Crappsley

Various sources contribute to air pollution and poor air quality in cities, but in Europe the biggest factor is traffic emissions. Our cities also feel the impact of the 'urban heat island' effect, which means that cities are warmer than their hinterlands, in some cases by up to 10°C. The record-breaking increases in global temperature we are experiencing due to climate change will worsen this, as higher temperatures help trap pollutants near to the earth's surface.

Cities worldwide also face an increased prevalence of obesity. In a review of childhood obesity in ten major world cities, London had the most overweight children, with over a third seriously overweight by the time they leave primary school. London also had the second highest level of adult obesity, with only 57% of adults doing the recommended 150 minutes of exercise a week. Sedentary lifestyles are a key factor in being overweight, and increase the likelihood of heart disease and diabetes.

Across Europe our city populations are ageing, with many cities experiencing increased proportions of people over 65 years old compared with people of 64 or under. By

2035 the number of people over 60 in London will increase by 48% to almost two million, while those aged under 60 will increase by only 12%. Ageing has significant health implications, including chronic diseases and diminished quality of life due to reduced mobility and social exclusion.

These health issues are complex and multi-faceted, requiring wide-ranging solutions. Urban planning including better street design can be part of the solution. Streets make up a significant proportion of land in our cities; in London 12.3% of land area is streets, almost as much as the 13.4% occupied by buildings.

Taking a more 'complete' approach to street design can result in better streets that both make cities more liveable and provide wider health benefits. Complete streets are designed to be safe, convenient and comfortable for everyone, regardless of transport mode, age, ability, income, race or ethnicity. Complete streets are also designed to support the creation of attractive places where people want to spend time.

SDG recently prepared a Complete Streets Design Handbook for Orange County in California, USA. The urban form in Orange County is less compact and has lower density than many European cities, but many underlying health issues are the same. Moreover, the principles for designing streets to be more complete can readily be applied to European cities. A complete street includes facilities for walking, cycling, and public transport which support mode shift, reduce vehicle numbers, and therefore help

reduce traffic emissions and improve air quality. Typical complete street elements are illustrated above and include:

- 1 Narrow lanes, tight corners and traffic calming measures which encourage slower, steady traffic, make streets safer, and help reduce vehicle emissions.
- 2 Facilities such as wide and comfortable footways and crossings which make it easy for people to walk, help combat sedentary lifestyles, and reduce risks of disease.
- 3 Well-designed cycle lanes which encourage cycling and help combat sedentary lifestyles.
- 4 Greening using street trees and other planting which help reduce urban temperatures and manage stormwater run-off. Shade trees make walking and cycling more comfortable in summer. Specific types of plants can also help absorb airborne pollution.
- 5 Parklets and café seating which encourage social interaction, provide natural surveillance, and make streets welcoming places.
- 6 Accessible design elements to ensure that people of all ages and abilities can use the street.
- 7 Seats at regular intervals increase comfort by providing rest points; especially helpful for older people or people with mobility problems.
- 8 Lighting for pedestrians which improves personal security, increasing the use of streets after dark.



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# An infrastructure plan for the next twenty years



**The Colombian government wants to position the country as a power in transport infrastructure so as to increase competitiveness and to overcome the underinvestment of the twentieth century. The Intermodal Transport Master Plan, with investment of approximately US\$ 3.3 billion in the next ten years, and a new methodology to prioritise projects, will help them reach this goal.**

By German Lleras

Colombia's Intermodal Transport Master Plan (Plan Maestro de Transporte Intermodal – PMTI), a National Government initiative, is based on a methodology for prioritising infrastructure projects with a strategic goal of supporting national socioeconomic development.

The aim is that the intermodal network efficiently connects cities and areas of production and consumption, maximising the benefit on the national economy.

The main output of the PMTI, after an objective technical process to build an action and implementation plan, was an initial list of highway, rail, river, air and maritime projects to meet the country's transport infrastructure needs for the next twenty years.

Steer Davies Gleave and the Foundation for Higher Education and Development (Fedesarrollo) were responsible for structuring the six basic steps for prioritising this primary transport network.

**1. Macroeconomic context.** We built projections of GDP by region and economic sector, and the generation of employment in the largest urban areas in the country. The aim was to identify growth and potential demand by region.

**2. Characteristics of demand.** An Origin - Destination (OD) matrix was built from information collected in surveys at a number of points along the spine of the country. This provided a detailed understanding of the variety of interurban travel.

**3. Definition of the core network.** The intermodal network was defined as spine and transverse corridors to ensure connectivity and integration of major urban conglomerations. This network was coded into a transport model describing its transport characteristics such as travel time, travel cost and corridor capacity.

**4. Demand projections.** The OD matrices were projected forward using optimistic forecasts of GDP and assigned to the network in the transport model. Projections were made to 2035, giving a 20-year horizon, enabling estimation of future traffic on each section of the core network.

**5. Prioritisation rules.** Two rules were used to prioritise the projects according to need:

- Sections with a high demand (load or vehicular traffic) which require a higher operational specification.
- Sections integrating towns and areas with productive potential or at a disadvantage to the major urban conglomerations.

**6. Prioritised projects.** Each project was graded according to its socioeconomic impact and its estimated running cost (CAPEX + OPEX). Projects with the best rating and the lowest costs were prioritised.

The PMTI includes more than 200 intermodal transport infrastructure projects, including improvement of 150 roads, renewal of five railways, navigability of eight rivers, 31 airport projects and dredging in both Atlantic and Pacific ports. The country will use the network infrastructure to improve accessibility in disadvantaged territories and communities, minimising operating costs to optimise foreign trade.

The success of the methodology used for the long term plan lies in its ability to assess transport projects simultaneously, analysing whether they are complements or competitors, focusing on the national government and investors interested in project prioritisation.

The project's success encouraged the government to continue refining the work, through a detailed analysis of projects to improve accessibility to urban agglomerations and to optimise logistics processes in the network and its key nodes. This is an opportunity for Steer Davies Gleave to contribute to and lead the strategic planning of the country.



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## Four decades of policy shaping projects

As we near Steer Davies Gleave's 40th anniversary we look back and reflect on some of the company's most significant projects. Projects that have helped shape transport policies globally.

By Mike Goggin

Four decades of successfully delivering policy-shaping projects make for a lot of projects! Too many to be able to cover them all here. So instead, this article focuses on a few key projects Steer Davies Gleave has been involved in over the years, and analyses their strategic importance.

### Illustrative key projects

#### Advisors to London's major new developments, since 1985 to date

We continue our 30-year relationship with the Canary Wharf Group, supporting the evolution of the existing Canary Wharf estate and its expansion onto new sites. Over the years we have advised on the estate's strategic transport links including the role and value of Crossrail and now we look to the future to keep growing the number of people working on the estate from the existing 110,000. We continue to support the implementation of the outline consent at Wood Wharf and the construction of the Shell Centre on the South Bank next to the London Eye on the River Thames.

We have maintained our 20-year relationship with the redevelopment of the Battersea Power Station site earmarked by Margaret Thatcher for development in the 1980s. We have worked on each proposal and supported the successful development, now finally under construction, which will see over 3,500 new homes and a new commercial and leisure destination for London.

We led the developments and arguments for the extension of the Northern Line, securing private sector, London and national government support. We have also helped Transport for London understand the development potential of future extensions of the Elizabeth Line and the Bakerloo Line.



#### European Union Transport Services Policy, since 1990 to date

We have been providing support to the European Commission on rail freight and passenger matters, aviation and coach for over a decade.

Our work on rail policy is a good example of our ability to assimilate a range of perspectives, international experiences and distil key policy choices.

We have researched the deregulation of the European rail services market for the Commission on four occasions, providing our assessment of progress, barriers and opportunities. Our work has considered passenger rights, the role of the European Rail Agency, Network Management Statements and the organisation of railway entities in Member States to support the ambition of open access rail services.

#### New high speed rail company in Italy, 2009 to 2015

We have provided technical support to a new privately owned high speed rail company operating in Italy since April 2012 under open access licensing arrangements.

Our work involved the verification of the company's business plan, assistance in the choice of the type of rolling stock, and monitoring its procurement.

#### Development of the USA's North East Corridor, 2011 to date

We were appointed by Amtrak as part of team to support its development of proposals for the future of the USA's most congested rail corridor serving freight, intercity and commuter railroads in five states and linking the key cities of Washington, Philadelphia, New York and Boston.

We developed ridership and capacity forecasts and capacity scenarios for different infrastructure capabilities and alignments, advised on rolling stock solutions and contributed to the financing and economic analysis of the scenarios.

#### A new model for Brazil's railways, 2014/15

We worked with two Federal agencies on the detailed development of the government's policy for increasing competition in the vertical concession structure of Brazil's railroads.

Offering insights from other railway structures, we provided advice and support on practical issues of inter-operability, access agreements, capacity allocation, freight tariffs and access charging.

As government policy changed from an open access model to a hybrid, we were on hand to offer practical support for development and implementation of the political aspiration.



### Colombia's new intermodal transport masterplan, 2015

We have provided technical advisory services for the development of a demand transport model of the country. Its aim is to evaluate scenarios that incorporate infrastructure projects, in order to build Colombia's Intermodal Transport Master Plan (Plan Maestro de Transporte Intermodal). A government initiative, this is based on a methodology for prioritising infrastructure projects with a strategic goal of supporting national socioeconomic development. The aim is that the network efficiently connects cities and areas of production and consumption, maximising the benefit on the national economy. More information on page 13.

### UK National Infrastructure Commission and London's Infrastructure Need Assessment, 2015

Working for the newly formed UK National Infrastructure Commission, we reviewed the case for large scale transport infrastructure investment in London, including a review of the case for the investment in Crossrail 2. Our recommendations on the priorities for development of London's infrastructure, the strategic and economic case for Crossrail 2, and the delivery mechanisms needed to secure large-scale housing delivery were adopted by the Commission.

### Development and management of transport infrastructure in Mexico, 2015/16

Appointed by the Federal Government's Treasury Ministry we are working with partners on a broad and detailed review of how Mexico's road, railroad, ports and mass transit infrastructure investments are identified, prioritised, developed, procured, constructed and then operated and maintained.

Engaging with public and private sector investors, contractors, concessions, development banks and other government departments, we have developed with our partners a comprehensive understanding of the issues and compared these with an extensive international best practice review of infrastructure development.

We are now moving forward on developing new methodologies and process re-design to give greater assurance on project delivery (cost, time and quality) and assurance of investment outcomes after completion.

### UK's new Transport for the North organisation, 2015/16

The North of England has been lagging behind the rest of the United Kingdom and it is the government's goal to turn this around through creating a Northern Powerhouse, which builds on the North's latent strengths to accelerate its growth. Improved transport connectivity has been identified as one of the key building blocks to realising this goal.

We have been working with a new body – Transport for the North – since its inception to help shape the transport strategy and programme that will underpin the North's future economic growth.

### Review of the future for UK's Network Rail, 2016

The UK Government appointed Nicola Shaw to make recommendations on the future financing and funding of Network Rail, Great Britain's national rail infrastructure owner/manager.

As Nicola's technical advisors we provided expert advice on railway management including safety management, capacity allocation and change management.

We developed an implementation change programme assessment for various scenarios and provided expert 'test and challenge' to the Report team's emerging recommendations.

### What are the underlying similarities?

As you can see there has been an array of exciting projects over the last few years, which continue to demonstrate our ability to work on complex and often politically sensitive policy choices for the development of transport services and city infrastructure.

I spoke with colleagues to ask them for their reflections on the success factors for these challenging assignment and the lessons we have learned for us and our clients in doing them.

Marco Concari, leader of our Italian business summarised it as: *"Across the projects I work on, I see growing recognition of the importance of planning infrastructure and services better. Political pressure to 'cut ribbons at opening ceremonies' will remain but there is growing evidence that the officials and the electorate want good value, sustainable and deliverable transport solutions."*

### What are the factors for SDG's success in delivering for our clients?

In Mexico our country leader, Lilita Pereira identified SDG's ability to integrate our insights and skills from across the company – *"Unlike some larger international companies we don't have the institutional barriers to resourcing projects and bringing expertise to bear. Employee ownership means we very much see it as 'we are all in this together' and that is demonstrated by sustainable commitment to projects over many months and years."*

And the forty-year perspective? Jim Steer, our founder, puts it down to maintaining absolute clarity on the policy objectives and on real world risks and uncertainty. *"Economic outcomes are always central in transport decisions, but so too are understanding customers and markets and operational realities"* he says. Jim attributes this focus to our independence from downstream construction interests and the passion that can only come from a dedicated set of professionals committed to the very best in transport-related decisions. These are key company attributes.

Here's to the next generation of challenging projects and policy choices. This consultant for one is looking forward to the challenge.



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# In-house innovation

Over the last decades, innovation and creativity have become factors critical to achieving success in developed economies. The need for creative problem solving has grown as more and more business problems require creative insights in order to find suitable solutions.

By John Swanson

Just about everyone agrees that innovation is essential in business today. In a constantly changing world new challenges arise all the time but so do new opportunities as knowledge and technology advance, and information is ever more widely and rapidly shared. However, innovation doesn't always just happen, it needs the right environment to thrive in, and this means giving employees the time and space to think about new ideas and opportunities, away from the usual short-term demands of office life. In a pressured environment this is not always easy to do, and it requires a deliberate managerial commitment.

Our Research and Innovation (R&I) programme is designed to create just such an environment. It has been running for three years now, with two streams of activity: our R&I Club which provides a forum for staff to bring forward new ideas, and our internal funding programme which supports larger R&I projects.

The R&I Club meets every second Tuesday, providing an open forum where SDG's employees can bring ideas or problems they think deserve further research. Over the past three years the Club has looked at more than 100 topics, many of them directly concerned with project work, but many others exploratory and speculative.

One idea to come out of the Club was our recent Hackday. The concept is simple: put a group of motivated and skilled people together for a concentrated period of time well away from their normal office environment; give them some tough problems to solve and see what happens. In practice there is much more to it, as our organisers will testify, but thanks to their careful planning



Steer Davies Gleave consultants taking part in Hackday

and the enthusiastic participation of the volunteers, the day was a great success. Four teams each worked on a project, with topics ranging from how best to use sophisticated techniques for data visualisation, to taking a radical look at the feasibility of 'peak-peak' charging to avoid overcrowding of transport infrastructure.

At the end of the day a judging panel chaired by our CEO, Hugh Jones, selected a winner and prizes were awarded. But matters do not end there; the next stage is to incorporate the outputs and experience won from these exercises into our daily consultancy work. That is where the internal funding programme can help, as it provides a way to give staff more substantial periods of time and resources to carry out larger development projects.

We regularly communicate these R&I achievements, and in the summer we held our latest showcase event for clients and partners, where we gave six quick-fire presentations on internally funded R&I projects (see right).

We firmly believe that nurturing a culture of innovation and curiosity adds greatly to job satisfaction among our staff and to the quality of service we can offer to our clients, but now we have mounting evidence that these research and innovation projects are delivering a return in terms of new work and exposure to clients. This benefits us, as a business, but also our clients, who gain from the investment we have made. We look forward to more innovation and success in the coming year.



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#### Funded R&I projects showcase

- **Benchmarking light rail and metro costs:** A database and comparative statistical analysis of the construction costs of 20 metro and 20 light rail systems from around the world.
- **Journey planning innovations:** Incorporating an open trip planner, an open-source routing algorithm, into our journey planning software, using Vancouver as a test case.
- **The impact of fuel price changes on sales:** Petrol and diesel prices fell sharply at the end of 2014; this project looked at the impact on sales of fuel in the UK.
- **Measuring sustained PTP change:** Looking at the long term effects of personal travel plans on travel behaviour in Thurrock and Cheltenham, up to 30 months after the interventions.
- **A rail incident Twitter database:** A database of tweets from National Rail Enquiries, the train companies, Transport for London, and others, to plot activity over time, and, using hashtags, identify service disruptions and their causes.
- **UDM-Lite:** A live demonstration of a new, lighter, version of our Urban Dynamic Model, with much quicker set-up and run times, used to model the impacts of transport investment on economic activity.





## Oxford Street West

**Oxford Street is arguably London's most well-known thoroughfare and it is the most important retail centre in the United Kingdom attracting approximately 3.5 million visitors each week. Despite this, Oxford Street is affected by a number of issues that deter people from visiting.**

By David Sutanto

Some of these deterrents are related to the crowding on footways, which results in pedestrian comfort being compromised. The street also has poor air quality, and conflicts between different road users are common and create road safety issues.

In 2018, the opening of the Elizabeth line (Crossrail), a major new east-west rail line across London, will have a fundamental impact on Oxford Street. The Crossrail station at Bond Street will increase by almost a fifth the number of people living within 45 minutes of the area by public transport. This presents a clear opportunity for Oxford Street, but could also exacerbate existing issues.

Steer Davies Gleave has been working collaboratively with Transport for London, Westminster City Council and a wider consultant team, examining a range of options for improving the western section of Oxford Street (between Marble Arch and Oxford Circus). These range from smaller scale interventions through to full pedestrianisation.

We have worked to resolve a multitude of complex issues that are inherent in each option. For example, we have examined

how bus routes, bus stops and bus stands are affected in each option, both in order to create solutions that function at a strategic level, delivering a coherent bus network that provides useful links, and at a detailed level that makes bus stop locations compatible with footway widths and abutting land uses.

We have also developed and applied a transport impact assessment framework, which links to the West End Partnership's strategic vision for the area. Our framework enables the relative advantages and disadvantages of each option to be measured and compared against a broad range of objectives, informed by analysis undertaken by us and our partners. This high profile project is ongoing, and we hope that it will ultimately lead to improvements to Oxford Street that make it a place where people—both Londoners and visitors alike—enjoy spending time.

We have also worked extensively on other projects in the West End, including the Deliveries & Servicing Plans project (see right), Westminster Walking Strategy (which is out to consultation), and Marylebone Low Emission Neighbourhood bid, which has been successful and secured Westminster City Council £1 million towards improving air quality in Marylebone. This gives us unrivalled insight into transport issues and stakeholders in this area.



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### Project updates

#### New business models to support funding for greener cities

Across Europe there is an increasing focus on greener cities. By 2025, Copenhagen aims to be the first capital city in the world to become carbon neutral. Copenhageners will make 75% of trips by bicycle, on foot or by public transport. In the UK, central and local government are raising green transport higher on the agenda, looking for long term cost savings as well as improving emissions. Green transport can be viewed as a risky investment with uncertainty of demand and upfront infrastructure costs. By working closely with potential stakeholders, innovative business models can be created to share the risk and to stimulate investment. We are currently working on a number of projects with the public and private sector exploring green transport business models and potential sources of funding and financing to support strategic investment.

#### Managing deliveries and servicing

London's population is booming and is expected to grow over the next 25 years. Coupled with the growth of online shopping, the volume of delivery and servicing trips is only set to increase, leading to worsening air quality and congestion. Reducing the impact of deliveries and servicing is therefore critical to enable London to grow. SDG was commissioned by Cross River Partnership, a public-private partnership that has been delivering regeneration projects in London since 1994, to work with 18 businesses, ranging from offices, retail and event venues to hotels and restaurants. We reviewed their current delivery and servicing arrangements and identified potential measures to improve their efficiency and reduce their impact on the local highway network. We developed bespoke delivery and servicing plans for each business, with the benefits achieved by their implementation set out in case studies so that 'best practice' can be shared with others. Small changes from each business, such as reducing the frequency of stationery deliveries or using suppliers with low emission vehicles, can collectively help to reduce the impact of businesses on London's environment.





## Road user charging – an equitable solution to budgetary constraints?

**Most countries find it difficult or even impossible to provide sufficient resources for the optimal maintenance and rehabilitation of their roads. Road infrastructure has a very long life if maintained properly, but rapid growth of traffic, and in particular of goods vehicles, exerts pressures on both the capacity and road pavement performance.**

By Anita Mauchan

This deterioration is costly to existing road users as their vehicle operating costs increase and they suffer from the negative effects of increasing congestion. There are concerns on social and environmental grounds, as road safety deteriorates and vehicle emissions rise.

Traditionally the public sector repairs deteriorating roads from its fiscal budgets. However, if fiscal budgets are constrained, roads will continue to deteriorate and economic, social and environmental costs will increase. Many countries have tried to combat this by levying charges on road users. These revenues already provide a much-needed source of funds to expand and maintain road networks in countries as diverse as Brazil, Ghana, India, Japan, Mozambique, Russia, South Africa, the United Kingdom and the United States of America.

### Why charge?

Charging road users provides the following benefits to the public sector:

- 1. New, stable and dedicated source of funding and finance.** Charges provide an incremental and ongoing revenue source, which is not tied to the annual government budgetary process, and importantly can be used as collateral to raise third-party finance (project finance/PPPs) to fund further expansion of the road network.
- 2. Applies the 'User Pays' principle and the internalisation of external costs.** Some governments have introduced charges in pursuit of a general policy to increase the extent of 'use-related payment' within a 'sustainable' transport policy.
- 3. Facilitates private sector development.** The involvement of the private sector can allow the government to finance at least part of the road network development 'off balance sheet'.

It is crucial that a government considering road user charging establishes clear objectives for its charging policy, as these will direct all activities undertaken (both in the early years and during the operation of the road as regulatory questions arise) and will influence the final tariffs charged to road users.

### Potential consequences of charging

Intentional and unintentional consequences of charging may include:

- **Cost recovery.** Revenues may not be sufficient to cover all costs, including construction, operation and maintenance. In developing countries where traffic levels are low or where construction costs are high, it is unlikely that the revenues will ever cover more than operation and maintenance and perhaps a part of the construction cost.
- **Revenue risk.** Whether the risk is held by the public sector, the private sector or shared, there is always a risk that outturn revenues may be insufficient to cover debt payments and operating costs, which may lead to bankruptcy or require sovereign debt guarantees to banks for payment of the debt.
- **Diversion of traffic away from the new road.** Price elasticity of demand and the provision of free alternatives to the charged road will affect the level of traffic on the facility. In turn this may mean that some potential economic benefits of the new road are lost if its objective is to move people and goods more reliably and quickly.

- **Social impacts.** Charged roads can have positive and negative social impacts. Of particular concern is the potential inequity that can result from charging low-income users, particularly those who use the road frequently.
- **Political and public opposition.** Political opposition to road charging has been significant in some countries. Motorists often perceive that they are paying for the road twice, by paying a charge and through their taxes, when in fact their taxes are being used to fund other roads.

### What charge to levy?

In reality, charges are a compromise between financial needs and economic benefits, they provide sufficient revenue to service loans or to recover budget, but are not so high as to make them unaffordable or to seriously discourage their use by motorists.

The level of charge is highly dependent on the level of cost-recovery desired. Charges can be:

- **Revenue-maximising.** To recover as much of the cost, operation and maintenance of the facility as possible.
- **Welfare-maximising.** To recover a contribution to the operating and maintenance costs of the facility whilst maximising the economic and social benefit of the infrastructure.
- **Operation and Maintenance Cost Recovery.** To recover the ongoing operating and maintenance costs of the facility, the construction cost having been paid out of government budgets.

Charges will also vary according to vehicle classification; time of day/day of week; cost of road construction; social considerations (such as High Occupancy Toll lanes); geographical area (such as London Congestion Charge); and loyalty programmes.

Other systems of area charging rely less directly on road use. Vignettes are generally economical to operate and overcome some criticisms of inequity by charging flat fees for access to the road network, thereby providing an incentive to users to maximise their use of the charged roads.

### How to charge equitably and proportionally?

A charging strategy should be designed to ensure that no road users are severely disadvantaged in comparison with other road users. Various strategies are used in practice to promote charging on an equitable basis.

- **Level of service improvements.** Charges should only be introduced on roads which have received significant upgrading or on new roads of a high standard.
- **Local and frequent user discounts.** Local and frequent discounts can be considered to reduce the financial burden on road users.
- **Provision of a parallel charge-free alternative.** A free parallel road ensures that those unable or unwilling to pay a charge can still have access to the road network.
- **Discounts by payment method.** The cost of collecting road user charges varies according to the technology installed. Many concessions reward their users with discounts when they use more cost-effective payment techniques, such as electronic tags.
- **Distance between charging points.** Some countries specify the distance between charging points to ensure that users are not over-burdened with payment requests and to allow free local movements between charging points.
- **Cross subsidy between different parts of the network.** Some existing roads are charged in order to provide revenue for construction of new sections of the road network.

In conclusion, road user charging can provide a new, stable and dedicated source of funding for road infrastructure. By applying the 'user pays' principle, governments can direct scarce budget resources elsewhere. The road user pays for the service offered by the road in the same way that railways, pipelines, power grids, water, broadcasting and broadband networks are paid for. However, road user charges should strike a balance between social, environmental and financial constraints, ranging from those that maximise revenue to those that maximise welfare.

Potential consequences of charging include the uncertainty that revenues will be sufficient to cover all the costs of construction, maintenance and operation (revenue risk). Toll roads are rarely self-financing, often still requiring substantial public subsidy, and may create long term liabilities for governments. High charges can result in diversion onto less suitable routes, resulting in the loss of some of the potential economic benefits of the road accruing from improvements in travel time reliability, time savings, vehicle operating costs and road safety.



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\* This article is a summary of an Executive Brief prepared by Matt Bull and Anita Mauchan for the Public-Private Infrastructure Advisory Facility (PPIAF) of the World Bank.

## Project updates

### Department for Transport Road Studies

To inform the UK Government's next Road Investment Strategy, the Department for Transport has commissioned six studies designed to address the biggest challenges facing the strategic road network across England. Larger than single projects, they are designed to assess how to address major gaps in the network or complex pinch-points that require multi-part solutions. The outcomes are expected to include proposals for detailed development, with construction intended to begin before 2025. Steer Davies Gleave is supporting three of the six studies (Oxford to Cambridge Expressway, M25 South West Quadrant and Northern Trans-Pennine Routes) through providing expert advice on transport strategy, planning and land use, and the economic impacts of transport investment.

### Oxford to Cambridge Expressway

Launching the Oxford to Cambridge Expressway study, Roads Minister Andrew Jones said "improved road links between Oxford and Cambridge will allow hardworking families to have better access to jobs, shops and leisure facilities." In collaboration with Highways England and local stakeholders, our work will contribute to the consideration of options for improving connectivity between the towns and cities from Oxford to Cambridge, and the extent to which better transport infrastructure could support growth by delivering improvements to productivity and employment.

The project was given greater political significance when, following his Budget Statement in March, George Osborne, former British Chancellor of Exchequer, asked the National Infrastructure Commission (NIC) to "make recommendations to maximise the potential of the Oxford – Cambridge corridor as a single, knowledge-intensive cluster that competes on a global stage." We look forward to submitting our findings to the NIC and informing their examination of the opportunities presented by the corridor.



# Complex questions. Powerful answers.

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Infrastructure, cities and transport are constantly evolving to meet new demands, new ideas and new technologies. Mixing rigour and technical expertise with an open-minded, imaginative approach, we help our clients maximise opportunity and realise value within this rapidly changing landscape.

Impartial, objective and results-driven, we are never content simply to meet expectations. We combine our commercial, economic and planning expertise to find powerful answers to complex questions. Answers that help people, places and economies thrive.