Union Connectivity Review

Final Report

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Foreword

Sir Peter Hendy CBE
Chair, Union Connectivity Review

Following my interim report in March, this is my final report.

Transport connectivity is vital to economic growth, job creation, building houses and social cohesion. Building back better and levelling up will be hugely assisted by better connectivity between the nations of the United Kingdom, which is why the Prime Minister asked me to review the UK's transport connectivity a year ago.

Stakeholder responses to my call for evidence were numerous, my round table (virtual) meetings were well attended, calls for connectivity improvements across the Union—of which there were many—were passionate, and the social research conducted for this review confirmed that the public wants better transport connectivity between the UK nations and believes it will lead to better access to jobs and housing.

I wrote in March that devolution has been good for transport where delivery has been devolved, but that this has resulted in a lack of attention to connectivity between the nations of the United Kingdom; that the Government's policies to build back better and for levelling up entail making different, wider strategic cases for transport investment across the country (in line with the Treasury's latest Green Book revision), and that leaving the EU and its Trans-European Network has created the opportunity to establish UKNET – a strategic transport network for the whole United Kingdom, which, with funding and regular review, can much better serve the overall economic and social needs of the whole of the UK.

Using appropriate criteria, this report now identifies transport corridors that I believe should be contained within this network and focuses specifically on those that are important for connectivity between the nations of the UK and where improvements to those would serve the UK better.

In my interim report, I listed some key concerns raised by stakeholders; I now set out below—and substantively in the report—what I think needs to be done for better Union connectivity:

In summary, these are:

- investing in the West Coast Main Line north of Crewe to properly use HS2 and its faster journey times and capacity to serve connectivity between Scotland and England better;

- conducting an assessment of the East Coast rail and road corridor to determine appropriate investments for better connectivity between Scotland and England;

- upgrading the key A75 link to improve freight and passenger connectivity with Northern Ireland;

- improving connectivity between North Wales and North West England on the A55, M53 and M56 roads and on the North Wales Coast Main Line for faster journey times, more resilience and capacity, utilising HS2 and electrification to better serve North Wales, and for connectivity with Northern Ireland and the Republic;

- relieving congestion on the M4 South Wales and England corridor by speedily implementing the Burns Commission recommendations and easing capacity restrictions at the junctions of the M4, M5 and M32;

- improving rail journey times and capacity to link Cardiff with the Midlands and beyond;

- improving connectivity with Northern Ireland through better transport infrastructure, better rail capacity and journey times, better rail connections to airports and participation in the All-Island Strategic Rail Review;

- taking measures to improve domestic aviation connectivity;

- driving sustainable domestic aviation;

- securing better connectivity for freight across the UK with ports, and freeports as they are established; and

- maintaining high sustainability standards on UKNET going forward.

This is clearly not a comprehensive list of potential improvements to the whole of the proposed network; for example, better passenger and freight connectivity across Northern England is a key feature of the Integrated Rail Plan following the work of the National Infrastructure Commission. But my recommendations would form a substantial programme to improve the connectivity of the nations of the UK.

The Government will need to ensure a clear funding stream for improvements to the network which recognises the benefits to the whole of the UK of improving transport links, some of which are the responsibility of the devolved administrations and would otherwise fall to be funded solely by them.

I see the network adapting over time as the UK's economy and society evolves, so it will properly be for the Government to decide what the network should be, establish the way it is managed with the devolved administrations and review it periodically to ensure it best serves the UK.

In most cases, the report does not contain brand new detailed infrastructure proposals; that cannot be a surprise, given the lack of attention as a result of devolution referred to above. Instead, I point the way to further work which should better identify where, when and what to invest in for the best results.

Since my interim report, the Government has published its transport decarbonisation plan. In line with my commission, where appropriate, I look to multi-modal reviews to best solve existing capacity and journey time issues in a sustainable way. Where aviation is the best option, I outline approaches to reduce its environmental impact.

COVID-19 continues to make forecasting future demand for transport difficult; but whatever the future and extent of home working, the likely demand for longer distance movement and the movement of freight—as a result of an increasing population—is likely to continue. As individual analyses are done in the areas I recommend, the future position should be clearer and can be incorporated.

I was encouraged that, following my interim report, the Government allocated £20m to start work on some of the individual areas identified for improvement. I am sure that the Government reply to this report will set out progress in the allocation of that funding to establish schemes on individual parts of the proposed network where early improvement will improve Union connectivity.

I was also asked specifically to assess the practicability, costs and timescales for a fixed link between Northern Ireland and Great Britain. The resultant report is published alongside this final report. I am grateful to Professor Douglas Oakervee CBE and Professor Gordon Masterton OBE who have led this piece of work.

Many individuals and organisations gave me their views; to all of them, I am grateful. Since some of the transport links between UK nations are the responsibility of the devolved administrations, clearly there are some sensitivities in my looking at this from a UK perspective; but, for the most part, I have been helped and I am grateful to those in the devolved administrations who have done so, and to the Irish Minister for Transport, with whom I was encouraged to interact and who was most helpful.

The expert advice of my four advisors—Professor David Begg, Neale Coleman CBE, Michèle Dix CBE and Elaine Seagriff—has been invaluable; my profuse thanks to each of them. I have also been greatly aided by a small team of officials at the Department for Transport, as well as others across government, and some expert contractors. However, the conclusions are mine alone.

I now defer to the Government for their response to this review and their decisions on how to take these proposals forward.

Sir Peter Hendy CBE

The Review

The UK Government asked Sir Peter Hendy CBE to undertake a detailed review into how transport connectivity across the UK can support economic growth and quality of life in England, Scotland, Wales and Northern Ireland[1]. Sir Peter was also asked to make recommendations as to whether and how best to improve transport connectivity between the nations of the UK.

As part of the review, Sir Peter was also asked to assess the feasibility of constructing a fixed transport link between Great Britain and Northern Ireland. The findings of this study have been published in an accompanying document.

To support Sir Peter in this review, he appointed a panel of leading transport experts and the Department for Transport provided a team of officials to act as a secretariat.

An interim report[2] was published in March 2021, which set out Sir Peter's approach to the review and his initial findings.

In delivering this review, Sir Peter has consulted widely with government departments and agencies, the devolved administrations, local authorities and infrastructure commissions as well as with the public, industry, academics and engineering experts.

Executive Summary

Good transport connectivity supports economic growth, jobs, housing and social cohesion. The Union Connectivity Review has assessed the existing transport network in the United Kingdom and has sought to identify how it can better support these aims in England, Scotland, Wales and Northern Ireland.

The Review has sought views from stakeholders across the United Kingdom, including government departments and agencies, the devolved administrations, metro mayors, local authorities and infrastructure commissions as well as the public, industry, academics and engineering experts. A public call for evidence received 147 submissions which identified a range of issues relating to travel between the nations of the UK.

To better understand the views of the public the Review also commissioned a survey of people living across the UK. This included a UK-wide survey, in-depth interviews and focus groups. It showed that people want to travel to and from other parts of the UK for personal and work reasons and that there is strong support for further investment in transport infrastructure to better connect England, Scotland, Wales and Northern Ireland.

The Review has considered the impact of devolution on the delivery of transport connectivity and has concluded that devolution has been good for transport with many forward-thinking transport developments taking place regionally in the nations of the UK. There is no doubt that regional authorities are best placed to understand the needs of local communities and deliver real change locally to improve people's lives. However, there is a gap in UK-wide strategic transport planning that has resulted in cross-border schemes and those where the costs and benefits are in different nations seeming to be a lower priority than other schemes which may provide greater local benefit.

To address these issues, the Review is recommending the creation of UKNET – a strategic transport network for the whole United Kingdom. This would be a multi-modal, pan-UK network based on a series of principal transport corridors. This would support long term economic growth, jobs, housing and social cohesion, the UK Government's levelling up agenda and net zero ambitions. The Review has identified the key role of the UK Government in developing such a network, the need for collaboration with the devolved administrations of Scotland, Wales and Northern Ireland and the need for an appropriate level of funding.

To support the network, the Review has identified a series of transport infrastructure enhancements needed to improve capacity, reliability, journey times and sustainability on key strategic links across the UK.

The Review recognises the outcomes of the 2020 review of HM Treasury's *Green Book* which found that business cases often place a heavy reliance on the benefit cost ratio. The revised *Green Book* has put greater emphasis on developing the strategic case, assessing environmental impacts and capturing and presenting transformational change: all criteria which are very much appropriate to establishing the wider economic case for spending on better connectivity across the UK and levelling up.

Because the Union Connectivity Review is concerned with the broader economic and social factors, including levelling up and wider environmental considerations, it has, in line with the recent review of the *Green Book*, considered a range of criteria rather than taking a narrow benefit cost ratio approach.

The Review has also considered current transport policies that affect the ability of people and goods to travel between the nations of the UK. It has engaged with stakeholders and policy experts across the UK to understand these issues and the resulting analysis has produced the recommendations overleaf.

Ultimately, the movement of goods and people throughout the United Kingdom occurs with no regard for internal administrative borders. Individuals and businesses using all modes in the UK are concerned with journey times, cost, reliability, frequency and the environmental impact of their travel.

The UK Government and the devolved administrations are encouraged to collaborate constructively to address the issues identified by the Review to support the movement of goods and people between the nations of the UK which will improve economic growth, jobs, housing and social cohesion for all.

Summary of Recommendations

The UK Government should:

1 Design and implement UKNET – a strategic transport network for the whole of the United Kingdom, and commit funding to improve the network, in particular, the parts that are not performing well;

2 Plan improvements to the network using multimodal corridors, which should be reviewed regularly and appraised on a wider economic basis in order to support government objectives such as levelling up and net zero; and

3 Gather data on a UK wide basis to support decision making relating to the network.

To support improved connectivity to, from and via Scotland, the UK Government should:

4 Reduce rail journey times and increase rail capacity between Scotland and London, the Midlands and North West England by upgrading the West Coast Main Line north of Crewe and reviewing options for alternative northerly connections between HS2 and the West Coast Main Line;

5 Seek to work with the Scottish Government to develop an assessment of the East Coast road and rail transport corridor from North East England to South East Scotland, including improvements on the East Coast Main Line and the A1; and

6 Offer funding to support the upgrade of the A75 to improve journeys between Northern Ireland and Great Britain.

To support improved connectivity to, from and via Wales, the UK Government should:

7 Work with the Welsh Government to undertake a multimodal review of the North Wales transport corridor, and develop a package of improvements focused on the North Wales Main Line (including better connectivity with HS2, and electrification), the A55, the M53, M56, and onward travel to and from the island of Ireland;

8 Recognise the urgent need to reduce congestion on the M4 and adopt a multi modal approach to the South Wales corridor by upgrading and building new stations on the existing South Wales Main Line, supporting the Welsh Government's package of public transport improvements and removing bottlenecks through targeted improvements at the junction of the M4/M5 to relieve congestion; and

9 Develop a package of railway improvements to increase connectivity and reduce journey times between Cardiff, Birmingham and beyond, which could include better rolling stock, timetable changes and enhanced infrastructure.

To support improved connectivity to and from Northern Ireland, the UK Government should:

10 Support the Northern Ireland Executive to develop, fund and implement a long term pipeline of improvements to transport infrastructure;

11 Agree with the Northern Ireland Executive a plan and funding to upgrade the railway on the Northern Ireland corridor, including better connectivity to the three airports and seaports, and to and from Belfast and Derry/Londonderry, and examine the potential to reopen closed lines; and

12 Provide funding and major project expertise to the Northern Ireland Executive to support their work with the Republic of Ireland relating to the All Island Strategic Rail Review and its implementation, including connectivity between Belfast and Dublin, between Derry/Londonderry and North West Ireland, and to and from the three airports and the seaports.

Where journeys are too long to be reasonably taken by road or rail, the UK Government should:

13 Revise existing subsidy rules for domestic aviation to allow support for routes between different regions of the UK (rather than just to and from London) and to allow multiple airlines to serve a single route;

14 Reduce the rate of domestic aviation tax; and

15 Intervene in the assignment of slots at London airports to provide more slots for domestic routes.

The UK Government should:

16 Drive the uptake of sustainable fuels and zero emission technologies on domestic aviation through a combination of incentives, tax benefits and subsidies to make the UK a world leader in developing these fuels and technologies;

17 Support the development of sustainable aviation fuel plants in parts of the United Kingdom that are particularly reliant on aviation for domestic connectivity;

18 Improve connectivity to seaports across the United Kingdom by enhancing rail freight connections and maximise the potential of freeports by investing in improved connectivity to and from these economic hubs; and

19 Maintain high environmental standards on UKNET such as the provision of electric vehicle charge points, the protection of the natural environment and integration with local active travel schemes and sustainable local transport options.

1

Part 1
Union Connectivity

The Role of Transport

Transport provides connectivity. It allows goods and people to travel from one point to another and maximises the potential for growth, jobs, housing and social cohesion. Although the Review anticipates that travel demand will broadly return to pre-pandemic levels, it also recognises the role of technology in reducing the need to travel and extending remote working trends, potentially prolonging the impact on public transport demand.
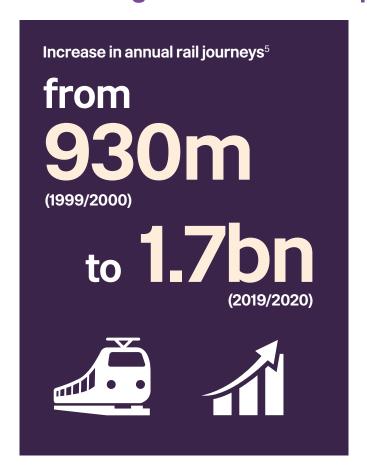
Better transport alone will not achieve positive strategic outcomes, but it will facilitate them. The effect of improved connectivity on these outcomes will be even more pronounced when considered as part of a comprehensive national strategy and when appropriate investment is made in the right places. This will also need to be complemented by investments in technology to enhance digital connectivity.

Economic Growth and Recovery

The UK Government has outlined its intention to build back better from the COVID-19 pandemic. This ambition was set out in March 2021 in *Build Back Better: Our plan for growth*[3]. The three core pillars of growth identified by the UK Government are infrastructure, skills and innovation, all of which are reliant on transport to deliver their full potential.

The UK's population is expected to grow to more than 72 million by 2041[4]. An effective transport network with adequate capacity is vital to ensuring that people, services and goods can move around the country. Collaborative long-term planning is essential to ensure that infrastructure investment aligns with future demand and to ensure that the approach to recovery from COVID-19 across the nations of the UK is complementary.

Bringing regions closer together results in economic benefits from reduced costs and journey times as well as greater access to skilled labour and other opportunities. These benefits are acknowledged by the UK Government and investment in transport infrastructure can provide a return many times greater than the total cost of development and construction.

Increasing demand for transport

Increase in annual rail journeys[5]

from **930m** (1999/2000)

to **1.7bn** (2019/2020)

Increase in road vehicle miles driven[6]

from **290bn** (2000)

to **356bn** (2019)

Increase in terminal passengers at UK airports[7,8]

from **151m** (1999)

to **297m** (2019)

Forecast increase in road traffic volumes of up to

51%

by 2050 compared to 2015 volumes[9]

Forecast increase in UK air passenger traffic of approximately

63%

by 2050 compared to 2016 volumes[10]

Levelling Up

There are significant economic inequalities across the United Kingdom. Research carried out by the Institute for Fiscal Studies identified the UK as one of the most unequal countries in the developed world and identifies some of the most economically challenged communities as being large towns and cities outside London and South East England[11]. There are also large inequalities within urban areas.

In some cases, the prosperity across the borders of the nations of the UK can change significantly and dramatically. For example, gross value added per head was £35,189 in Cheshire in 2019, while just across the border in Wrexham and Flintshire it was £27,593[12].

In 2019, in Cheshire the Gross Value Added per head was

£35,189

Just across the border...

In 2019, in Wrexham and Flintshire GVA per head was

£27,593

The UK Government has responded to this challenge and set out its intention to level up underperforming places through a long-term programme of investment. The UK Government believes that targeted interventions can have a direct impact on local economic performance. Levelling up has been a key consideration of the Review which has engaged with the Prime Minister's Levelling Up Advisor to share research and insights.

Climate Change

Climate change is the most significant long-term challenge facing the world today with many countries having declared climate emergencies. In June 2019, the UK became the first major nation to pass a net zero law to end its contribution to climate change by 2050[13]. The Welsh Senedd was the first Parliament in the world to declare such an emergency in 2019[14] with the Scottish Government also doing so in the same year[15]. The Northern Ireland Assembly passed a similar climate declaration in 2020[16].

The transport sector is the biggest emitter of greenhouse gases in the UK and is responsible for about 27% of all emissions[17]. To achieve its emission reduction targets, the UK must work to decarbonise the movement of people and goods. This can only be achieved through behaviour change, modal shift and the development and implementation of new low-emission technologies and fuels.

The UK Government has recently published a comprehensive *Transport Decarbonisation Plan*[18] which sets out the approach to reducing emissions while protecting the economic and social benefits of transport as well as the choice available to travellers. The Review has aligned itself with the aims and objectives of this plan.

The Personal Importance of Union Connectivity

Transport is central to the day to day lives of people that live in all the nations of the UK.

To better understand this, the Review worked with Ipsos MORI to undertake a UK-wide survey, one-to-one interviews and focus groups to better understand why people travel between England, Scotland, Wales and Northern Ireland, what challenges they currently face and their priorities for improvement.

The findings from this work indicate that people want to travel to different parts of the UK, and that people see transport connections as vital to allowing them to connect with friends and family, to enjoy leisure activities and for work.

A significant majority of people said they would be interested in travelling to other parts of the UK, particularly to England. In 2019, more people in Scotland, Wales and Northern Ireland travelled to England than abroad. More people expressed an interest in doing this when COVID-19 restrictions are removed than travelled the same routes in 2019.

People feel that it is important to improve transport links across the UK, with nearly eight in ten people in Scotland, Wales and Northern Ireland saying that it was important to improve transport links with England.

Two in three people thought that improved transport links would have a positive impact on people's ability to access job opportunities, whilst seven in ten thought this would make it easier for people to live in other places in the UK and improve access to key transport hubs. Most people also thought that access to public services and entertainment opportunities would be improved by better transport connections.

When asked about which transport modes and types of transport infrastructure should be prioritised to improve UK connectivity, rail and roads came out top in England, Scotland and Wales. Improvements to air travel and airports were the top priority for people in Northern Ireland.

Despite the perceived benefits from improved transport connections, a significant number of the public are concerned about the environment. About a third of people thought that increased investment in transport would be a negative thing from an environmental point of view and a similar number also felt negatively about a possible associated increase in carbon emissions while a quarter thought that there would be no difference.

Overall, there is support for improved transport links between the nations of the UK. Improvements to roads and rail services and stations are priorities for the public, which reflects the role of these modes in current travel behaviour. Improving air travel from Northern Ireland is also viewed as a key priority.

Further detail can be found in the full social research report by Ipsos MORI which has been published alongside this report.

45%

of people in the UK **travelled to another nation of the UK** at least once in 2019.

22%
travelled to **Scotland***

10% travelled to **Northern Ireland***

27%
travelled to **Wales***

64%
travelled to **England***

57%
travelled **abroad***

*At least once in 2019

7 in 10

people in Scotland who travelled to other nations of the UK once a month or more in 2019 **were more favourable towards the Union** than those who did so less regularly (5 in 10).

8 in 10

people who travelled to other nations of the UK once a month or more in 2019 **were more favourable towards the Union** than those who did so just once (7 in 10).

The percentage of UK residents living outside a nation who said they would be interested in travelling there, if there were no COVID related restrictions:

England
73%

Scotland
67%

Wales
63%

Northern Ireland
40%

79%

said it was important to improve links with England, including 40% who said this was very important. This sentiment was echoed by 69% for Scotland, 67% for Wales and 62% for Northern Ireland.

51%

of the UK public said rail services and stations should be given the highest priority for improvements. This was followed by motorways and major A roads (36%), and local roads (30%).

60%

thought that improving transport links between nations of the UK would make a positive difference to their own nation.

The Impact of Devolution

Devolution gives local areas, regions and nations the policy levers they need to facilitate economic growth, provide better access to jobs and services, and support the development of new housing and facilities.

In general, devolution has been good for transport, allowing transport authorities to service growing populations, develop local connections and facilitate effective rail and bus services. However, it has sometimes resulted in strategic cross-border transport schemes being less of a priority than those schemes which are wholly contained within a single nation.

The nature of cross-border transport schemes means that costs and benefits may fall within two or more of the nations of the UK. This makes advocacy for and investment in these schemes harder which sometimes has prevented progress.

This, as well as the existence of a range of national transport bodies, such as National Highways (formerly Highways England), Transport Scotland and Transport for Wales—each of which has a focus on transport links within their own nation—has led to less of a focus on connectivity between the nations of the UK and limited pan-UK strategic planning for a transport system which is essential to supporting the operation of the UK's single market.

It is important to consider the connectivity of cross-border regions and strategic journeys from a UK perspective to ensure that administrative borders do not limit investment and economic growth. Considering transport in this more strategic manner helps to support a strong case for transport investment as set out in the recent review of HM Treasury's Green Book[19].

Data Sharing

High-quality data across all transport modes and throughout the UK are key to managing capacity, tackling congestion and establishing an evidence base for effective policy decision making. However, most of the data currently available to the UK Government are predominantly related to journeys and movements within England. Devolved administrations and transport operators collect a significant amount of data on their operations but accessing this data for UK-wide public policymaking is a challenge.

The Review has identified the need for UK-wide data sharing to support improved transport planning and operations.

Part 2
UKNET – A Strategic Transport Network for the Whole United Kingdom

The case for **UKNET** – A Strategic Transport Network for the Whole United Kingdom

Having identified the importance of good connections across internal borders and the challenges that currently prevent a pan-UK strategic vision or investment strategy, the Review recommends that the UK Government develop UKNET – a strategic transport network for the whole United Kingdom which would connect all the nations of the UK, with appropriate funding and coordination with the devolved administrations to deliver it.

Other countries across the world have adopted different approaches to transport infrastructure planning with a combination of national and regional planning and delivery.

The European Union identified a similar need for good connections and the need to develop cross-border transport infrastructure and developed the Trans-European Network – Transport (TEN-T) in response. Until recently TEN-T included key elements of the UK's transport infrastructure, although those identified were chosen with a view to pan-European connectivity and did not necessarily best support the requirements of the UK. For many years, the UK financially contributed far more to TEN-T than it received back for infrastructure development. The UK's departure from the European Union has provided the opportunity to develop something that builds on the concept of TEN-T, but which better meets the needs of the UK and provides better value for money.

Another example of an effective and joined-up approach to transport planning is the US Federal Transit Authority which manages the assessment of federally-funded transit projects as part of a national programme of locally supported schemes.

UKNET would provide a network into which transport investment would be made on a pan-UK basis to support economic growth, jobs, housing and social cohesion, across the nations of the UK, for the benefit of the whole country.

It would allow transport appraisals for schemes on the network to be undertaken on a UK-wide basis with all costs and benefits being fully accounted for. This would limit the risk of cross-border schemes being deprioritised.

The development of such a network would provide additional certainty for businesses and the private sector, allowing them to plan complementary investments in specific regions and to invest in the supply chain across the country.

A network of this type was supported by a significant majority of stakeholders with 94% of respondents to the specific UKNET question in the call for evidence—including 100% of respondents from Scotland, Wales and Northern Ireland—being in favour of its development. It also received strong support during individual conversations and roundtables with business groups and other stakeholders.

By taking a multi-modal corridor-based approach to network planning, a network such as this would also maximise the choice of less carbon-intensive forms of travel.

On the following pages, the Review sets out the benefits of such a network, develops a proposed geographical scope and identifies specific improvements and policy changes that would support the operation of such a network. It recommends a discrete funding stream to support improvements in the network to improve union connectivity, but it does not seek to set out how such a network should operate or the governance arrangements for it. However, it is clear there is a substantive strategic role for the UK Government to define this network and to help to invest in it.

1 Recommendation

The UK Government should:

Design and implement UKNET – a strategic transport network for the whole United Kingdom, and commit to providing additional funding to improve the network, in particular, the parts that are not performing well.

2 Recommendation

The UK Government should:

Plan improvements to the network using multimodal corridors, which should be reviewed regularly and appraised on a wider economic basis in order to support government objectives such as levelling up and net zero.

3 Recommendation

The UK Government should:

Gather data on a UK wide basis to support decision making relating to the network.

Defining UKNET – A Strategic Transport Network for the Whole United Kingdom

To support increased growth, jobs, housing and social cohesion the Review has sought to define a UK-wide transport network.

This section provides a summary of the process by which the Review has defined the proposed network. Further detail can be found in the accompanying analytical report that has been published alongside this report and which forms the evidence base that the Review has drawn upon in formulating its recommendations. The analysis involves a review of current and future travel across the UK for each mode, outlining in greater detail the rationale behind the development of UKNET and the key connectivity corridors that are detailed in this report. It then uses this multi-modal evidence to identify opportunities for improvement in the proposed network before sifting these interventions against the seven objectives outlined later in this report to identify a shortlist of priority improvements.

The work also details several future changes which are likely to impact travel patterns across the UK in the longer term. One such change is the lasting impact of the COVID-19 pandemic, in respect of which the Review has made several considerations. Although the Review anticipates that road traffic across the UK will broadly return to pre-COVID levels, it also recognises that there is uncertainty around the persistence and longevity of home working and that this could potentially have a prolonged impact on public transport demand, particularly in peak times.

Whilst persistent home working would reduce demand pressure on aspects of the UK transport network, UKNET is mostly, though not entirely, focused on longer distance inter-city and inter-regional travel. Most commuter trips are either within cities or accessing cities from satellite towns. These do not tend to be the routes that are critical to the broader connectivity of the United Kingdom.

In incidences where the Review has considered shorter distance access to city-regions (as in Mersey Dee and South East Wales), it is content that the pandemic will not alter the underlying need to improve transport connectivity based on long-run population growth. Where the Review recommends further analysis be undertaken, this future work will likely be better placed to assess long term post-COVID demand.

To define the proposed UKNET, the Review has sought to identify all transport connections that meet one or more of the following four criteria. These have then been combined to form the basis of the proposed UKNET.

Direct Linkages Between Major Cities and Economic Regions

Cities and economic regions drive the economy of the UK and it is essential that they are connected to one another through road, rail, maritime (where appropriate) and, where there is no suitable road or rail alternative, air links. Where it is not possible to connect all cities and economic regions directly to the strategic network, they should have access via a local network.

The Review has defined major cities as those with a population of more than 500,000 or which are the capitals of the nations of the UK.

The Centre for Cities has conducted extensive research and has identified several smaller fast-growth UK cities, including Norwich, Peterborough, Cambridge, Milton Keynes, Oxford and Swindon[20]. These have a disproportionate impact on overall UK economic performance. While there is no direct link that currently joins all of these cities, work on links between them is continuing, including East West Rail between Oxford and Cambridge.

Connections to Major Seaports and Airports

As an island nation, the UK is particularly reliant on air and sea travel, so airports and seaports play a critical role in the UK's transport system. They are crucial for the domestic economy and international trade. In addition to this, several areas, such as Northern Ireland and the Scottish islands, are more geographically isolated from the rest of the UK and are particularly dependent on air and sea travel.

The Review has identified strategic airports as those that have annual total passenger volumes of more than five million or domestic passenger volumes of more than 500,000 passengers, annual freight volumes of more than 18,000 tonnes or which serve capital cities of the nations of the UK.

Activity at seaports is concentrated across a small number of key locations with just ten ports accounting for approximately 70% of all maritime freight movements in the UK[21] and 78% of all international sea passenger movements[22]. The Review has defined strategic seaports as those which serve key domestic and international passenger routes, those with annual freight movements of more than 15 million tonnes or those that have been designated with freeport status.

UKNET airports:

- Aberdeen
- Belfast City
- Belfast International
- Birmingham
- Bristol
- Cardiff
- Doncaster Sheffield
- East Midlands
- Edinburgh
- Gatwick
- Glasgow
- Heathrow
- Inverness
- Liverpool (John Lennon)
- London City
- Luton
- Manchester
- Newcastle
- Southampton
- Stansted

UKNET seaports:

- Belfast
- Cairnryan
- Dover
- Felixstowe
- Forth (Edinburgh)
- Grimsby and Immingham
- Holyhead
- Larne
- Liverpool
- London
- Milford Haven
- Plymouth
- Portsmouth
- Southampton
- Tees and Hartlepool

Discrete Cross-Border Economic Areas

Highly integrated cross-border economic areas exist within the UK and have distinct transport needs. Identifying these regions is important to ensure that administrative boundaries within the UK do not create limitations on connectivity resulting in poorer economic and quality of life outcomes.

The Review has sought to identify cross-border economic areas of significant economic scale, which are highly interconnected across a border, for example with significant numbers of cross-border commuters or regular regional freight flows. The following regions have been identified by the Review:

North Wales–North West England

At the time of the 2011 census, 25% of employees in this region were crossing the border between England and Wales for work[23] and access from North Wales to international gateways in England, such as Manchester airport, is particularly important for people and businesses. In 2019, 1.9 million people and 5.3 million tonnes of goods moved via the port of Holyhead to and from the island of Ireland[24,25].

South Wales–Greater Bristol Area

There is a relatively large population on both sides of the border and significant cross-border interaction in terms of people and freight movement. In the morning peak in South East Wales, the number of cross-border journeys is 70% higher than the number of journeys to other regions of Wales[26].

Freight Hubs

Efficient supply chains are crucial in delivering economic growth and attracting investment to the UK. Freight connectivity is an essential part of the successful operation of these. To support the movement of goods, road and rail freight hubs must be included within the proposed network.

The Midlands is home to a particularly high density of national distribution centres known as the 'Golden Triangle'. Located between Nottingham, Bedford and Birmingham it is the UK's primary distribution hub because of its relatively central location.

The Channel Tunnel is another vitally important freight connection with almost 1.6 million freight vehicles using this link to cross between the UK and France in 2019[27].

Essential Connections to Regional Networks and the Republic of Ireland

To ensure that UKNET can meet its objectives, more remote areas of the country must be able to access strategic connections to enable people and goods to move freely to other regions. These connections are important to support levelling up, improve social cohesion and facilitate economic development, particularly tourism which is central to the economic success of several of these regions.

The Review has identified the following regions as being particularly reliant on tourism and being significantly distant from existing strategic transport links:

- Devon and Cornwall
- Mid and West Wales
- The Scottish Highlands and Islands
- Enniskillen and Derry/Londonderry

These have been identified on the map of the proposed network to reflect their importance for regional connectivity and to support travel via the strategic network.

Many domestic trips between Great Britain and Northern Ireland pass through ports and airports in the Republic of Ireland and there are local economic links across the border between Northern Ireland and the Republic of Ireland. Northern Ireland's Department for the Economy estimates that 20% of the HGVs moving between Britain and Northern Ireland travel via the Republic[28]. Given that connections via the Republic of Ireland are not wholly within the UK, they are not included as part of the proposed network but are represented on the UKNET map in recognition of their strategic importance to UK connectivity.

UKNET – A Strategic Transport Network for the Whole United Kingdom

Legend:

- Major cities
- Fast-growth cities
- Cities with major ports / airports
- Regional economic centres
- Urban centres in the Republic of Ireland
- Linking cities, ports and airports
- Regional networks
- Across Irish Sea
- Onward connections to the Republic of Ireland
- ✈ Airports
- ⚓ Seaports

Map labels:

Thurso, Kirkwall, Stornoway, Inverness, Fort William, Aberdeen, Edinburgh, Glasgow, Derry/Londonderry, Letterkenny, Larne, Cairnryan, Carlisle, Newcastle, Sligo, Enniskillen, Belfast, Middlesbrough, Newry, Leeds, Holyhead, Manchester, Humber Region, Liverpool, Sheffield, Dublin, Nottingham, Shrewsbury, Peterborough, Norwich, Birmingham, Cambridge, Aberystwyth, Milton Keynes, Felixstowe, Milford Haven, Oxford, London, Swindon, Cardiff, Dover, Bristol, Portsmouth, Southampton, Plymouth, Penzance

This is a schematic outline of UKNET. Lines do not represent actual transport links.

Key Transport Network Corridors

Having recommended the proposed UKNET, the Review has identified the key transport corridors that it believes it should comprise. As set out earlier, these multi-modal corridors connect key strategic points and have been developed using an assessment of baseline transport and population data, input from stakeholders and responses to the call for evidence.
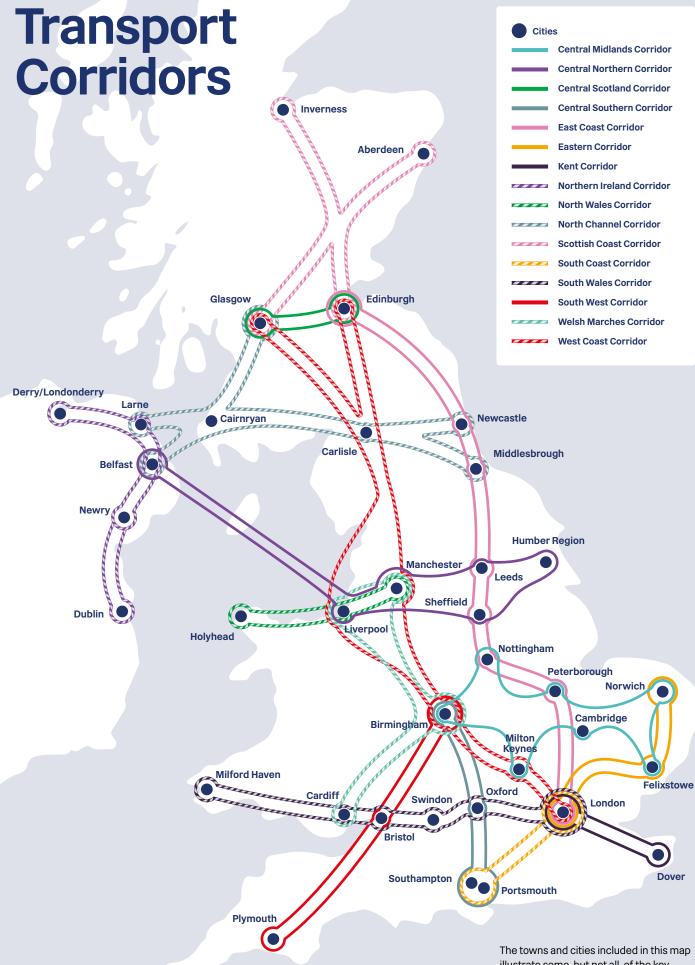
The Review has utilised these multi-modal corridors to assess the best infrastructure improvements to enhance connectivity and deliver jobs, growth, housing and social cohesion. These proposed infrastructure improvements were initially identified using the call for evidence submissions. This was bolstered with further analysis and evidence from published reports, transport agencies and other publicly available information which supported a multi-criteria analysis based on the following objectives:

- Improve transport provision across the Union.

- Support economic growth and recovery across the whole of the UK.

- Help address economic and social inequalities across the whole of the UK.

- Support quality of life across the whole of the UK.

- Support the UK's commitment to be net zero by 2050.

- Take advantage of technological innovation.

- Be consistent with the UK Government's fiscal strategy.

In keeping with the terms of reference, this report sets out the detail of those UKNET corridors which are most relevant for Union connectivity and for which the review has made recommendations for infrastructure improvements.

However, in recommending a strategic transport network that touches all four corners of the UK, and recognising that within-nation travel is essential to people's everyday lives and the success of businesses, the Review has also identified key corridors which do not span the UK's internal borders. These are also detailed in the corridor map and are discussed in greater detail in the accompanying analytical report to this Review. Each of these corridors also serves a crucial function in connecting people to key metropolitan centres for access to jobs, services or transport hubs. They also connect businesses to the freight network (such as at ports and airports) and to regional consumer and labour markets.

The Review also emphasises that identified transport corridors should not be seen in isolation and should be considered to be part of a UK-wide interconnected network with significant overlaps and interdependencies. Moreover, not all recommendations identified in this report relate specifically to cross-border schemes. To best support pan-UK transport connectivity, schemes that are wholly located within one nation of the UK, but which will result in benefits in other nations of the UK, have also been identified. It is also worth noting that the full benefit of investment in infrastructure can only be realised through the implementation of complementary operational changes.

Transport Corridors

Cities

- Central Midlands Corridor
- Central Northern Corridor
- Central Scotland Corridor
- Central Southern Corridor
- East Coast Corridor
- Eastern Corridor
- Kent Corridor
- Northern Ireland Corridor
- North Wales Corridor
- North Channel Corridor
- Scottish Coast Corridor
- South Coast Corridor
- South Wales Corridor
- South West Corridor
- Welsh Marches Corridor
- West Coast Corridor

The towns and cities included in this map illustrate some, but not all, of the key population centres in each corridor.

West Coast Corridor

Road links

Rail links

HS2 (under construction)

Glasgow

Edinburgh

The **M6** is the only motorway connection between Scotland and England and is a key freight corridor. There are approximately

50,000
crossings per day

which are dominated by business trips (50%) and HGVs (30%)[29,30].

The **West Coast Main Line** is the key rail artery for this corridor and the UK. The line has seen **passenger growth** of

over 100%

since 2008/09[31].

Manchester

Liverpool

In 2018–19 the **West Coast Main Line** serviced

7.6 billion
passenger-kilometres[32].

Crewe

Birmingham

Milton Keynes

London

The West Coast corridor is a key transport link connecting the south and north of the UK. It links some of the UK's largest population and economic centres including London, Birmingham, Manchester, Liverpool, Glasgow and Edinburgh. The M1, M6 and West Coast Main Line (WCML) are the principal routes on it. It is a key freight corridor supporting rail freight and HGV movements to and from major seaports and airports and the large logistics centres in the Midlands and onward to Northern Ireland.

Opportunities for Improvement

The WCML is one of the busiest railway lines in Europe with over 1.5 million annual cross-border rail trips within the UK taking place[33].

HS2

HS2 will reduce journey times and improve capacity and reliability between London, the Midlands, North West England and Scotland. It is currently planned that, once fully operational, HS2 services from London to Scotland will run twice per hour dividing at Carlisle for onward travel to Edinburgh and Glasgow, and one HS2 service per hour will run from Birmingham to Scotland. Edinburgh will further be served by the equivalent of two services per hour from the East Coast Main Line.

After Phase 2a is opened, HS2 trains will leave the dedicated high-speed lines, and capacity, journey speeds and reliability will be constrained heavily as they will use the existing WCML north of Crewe for journeys to and from Scotland. freight movements are, and would remain, constrained by the presence of passenger trains.

The Case for Faster Journey Times

Both the UK and Scottish Governments have previously agreed to develop options which could support a rail journey time between London and Scotland of three hours. A journey time improvement of this size, even when compared to expected journey times once HS2 opens, would dramatically increase the number of people travelling by rail.
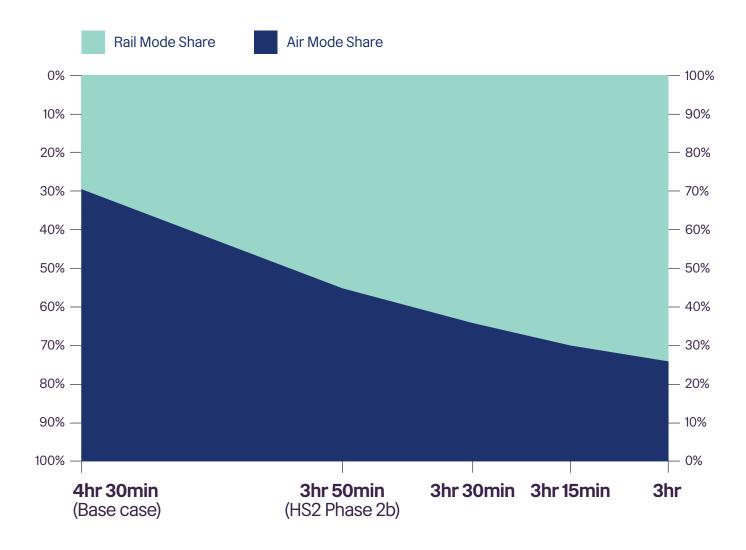
There is a correlation between journey times and how many people choose to travel by rail over air. If it takes the same amount of time to travel by rail or by air, the evidence shows that people choose to travel by rail[34,35]. Rail is typically favoured when the journey time is around three hours between city centres.

Work undertaken by Network Rail and HS2 Ltd on behalf of the Review has demonstrated the potential for increased trips by rail if journey times are reduced. For assurance purposes, two forecasting models[36] were used to assess savings of 20, 35 and 50 mins on the journey times forecast for HS2 Phase 2b. The outcomes for both models were broadly similar and the approach built upon the changes in mode share observed between rail and aviation following previous UK and European rail investments.

These initial estimates indicated that a three-hour journey time was forecast to increase the number of passengers by around four million a year and increase rail mode share from the 2019 level of 29% to around 75%. It was also forecasted that journey times in the region of three hours would generate considerable transport user benefits and revenues over the lifetime of the scheme.

Improvements to journey times that are made between London and Scotland will also benefit people travelling from the Midlands and North West England to and from Scotland. It is too early to say what the right balance between time savings and costs is; more work is needed to establish the most appropriate approach.

London–Scotland Journey Time vs Mode Share

Rail Mode Share   Air Mode Share

4hr 30min (Base case)   3hr 50min (HS2 Phase 2b)   3hr 30min   3hr 15min   3hr

Linking HS2 with the WCML

The UK Government has already acknowledged some of the issues identified by the Review. The 'Golborne Link'—the current proposed connection between HS2 and the WCML—is expected to deliver quicker journey times and more capacity between England and Scotland and resolve some of the constraints between Crewe and Preston.

However, the 'Golborne Link' does not resolve all of the identified issues. The suitability of alternative connections between HS2 and the WCML have been considered by the Review. The emerging evidence suggests that an alternative connection to the WCML, for example at some point south of Preston, could offer more benefits and an opportunity to reduce journey times by two to three minutes more than the 'Golborne Link'. However, more work is required to better understand the case for and against such options.

These benefits could also include additional operational flexibility when timing freight services and less disruption to the WCML than major upgrades as most construction could take place away from the railway. Further work is needed to determine the comparative user and wider benefits, costs and deliverability of an alternative connection alongside the interventions set out below.

Infrastructure

The Review has identified a range of possible infrastructure interventions including replacing and enhancing track, signalling and power supply systems, and possibly new sections of line north of Preston, which would maximise line speeds for the non-tilting HS2 trains and create greater freight capacity.

Each of these interventions will have different impacts in terms of timescales, affordability, benefits and value for money. Further work to define the possible scope and phasing of these interventions is currently being explored.

4 Recommendation

The UK Government should:

Reduce rail journey times and increase rail capacity between Scotland and London, the Midlands and North West England by upgrading the West Coast Main Line north of Crewe and reviewing options for alternative northerly connections between HS2 and the West Coast Main Line.

Access to UKNET

Communities in the Scottish Borders region are enthusiastic about the economic and social benefits they see resulting from an extension of the Borders Railway south, across the border, to Carlisle.

The Review also welcomes the £5 million[37] in funding that the UK Government has made available for the development of a possible extension to the Borders Railway which would support improved connections to and from Scotland and with the WCML at Carlisle.

East Coast Corridor

Road links
Rail links

15%
of all HGV traffic
between England and Scotland uses the **A1**.

Edinburgh

The **East Coast Main Line** has the busiest cross-border route between England and Scotland by rail, and has seen **passenger growth** of

40%
since 2008/9[38]
– carrying over

20 million
passengers a year[39].

Newcastle

Middlesbrough

Leeds

To London

This map depicts a portion of the East Coast Corridor route, not the entire corridor.

The East Coast Corridor is a strategically important national and regional transport link and is a connection for some of the UK's largest cities and city-regions. It is the other main route between England and Scotland and connects some of the UK's wealthiest and poorest communities, while also supporting key logistics hubs.

Opportunities for Improvement

On rail, the East Coast Main Line (ECML) is a key strategic connection with over 20 million passengers every year[40]. Capacity, journey times and reliability are constrained by the existing infrastructure and this will be exacerbated north of York with the introduction of digital signalling on the southern part of the ECML.

HS2 Ltd undertook a review of journey times, capacity and resilience on the ECML as part of its *2016 Broad Options Study*[41]. This identified a series of potential infrastructure improvements that would support increased and faster journeys between London and Scotland. These included significant amounts of new track north of Newcastle and bypasses near York and Durham.

The UK Government's forthcoming *Integrated Rail Plan* will also be considering potential improvements to the ECML; although this will have a focus on north-south connectivity, it will not include cross-border connectivity.

On road, 15% of all HGV traffic between England and Scotland uses the A1[42], however, speed limitations for HGVs on this road significantly impact reliability and capacity. This is particularly pronounced between Newcastle and Edinburgh. The non-continuous dual carriageway also causes safety issues on this route[43].

Four sections of the A1 in England are already under consideration for improvement as part of the *Road Investment Strategy 2*[44], but traditional transport appraisal methods are unlikely to produce a positive business case for any major upgrades north of Newcastle due to there being relatively low traffic flows on this stretch of road for a strategic route[45].

There has been no attempt to develop a business case for an upgrade to the A1 which considers the cost and benefits of doing so along the full extent of the route between Newcastle and Edinburgh. There has also been no attempt to undertake a multi-modal or cross-border study which could result in much better outcomes than considering specific stretches of individual modes in isolation.
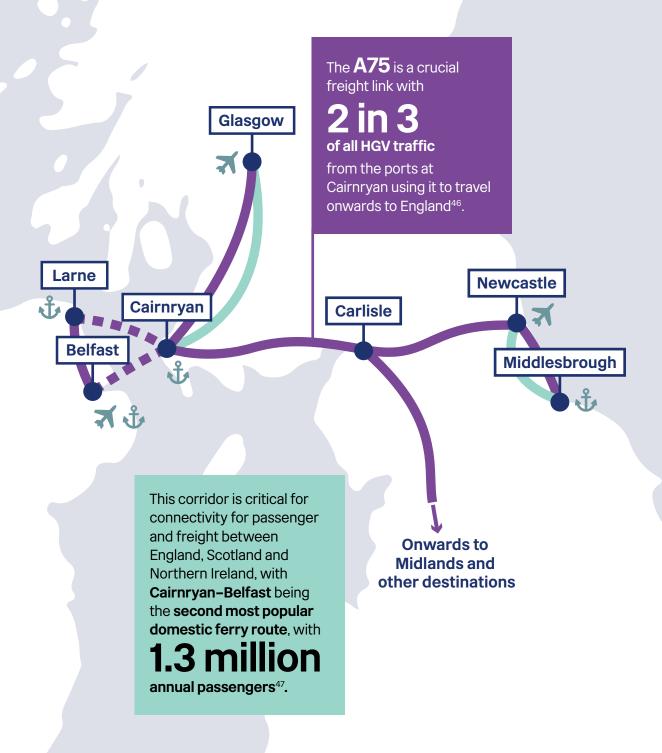
5 Recommendation

The UK Government should:

Seek to work with the Scottish Government to develop an assessment of the East Coast road and rail transport corridor from North East England to South East Scotland, including improvements on the East Coast Main Line and the A1.

North Channel Corridor

Legend:
- Road links
- Rail links
- Sea links

Glasgow

The **A75** is a crucial freight link with

2 in 3
of all HGV traffic from the ports at Cairnryan using it to travel onwards to England[46].

Larne

Cairnryan

Belfast

Carlisle

Newcastle

Middlesbrough

This corridor is critical for connectivity for passenger and freight between England, Scotland and Northern Ireland, with **Cairnryan–Belfast** being the **second most popular domestic ferry route**, with

1.3 million
annual passengers[47].

Onwards to Midlands and other destinations

This corridor is critical for connectivity for passengers and freight between England, Scotland and Northern Ireland. Cairnryan is Scotland's busiest port, handling 2.7 million tonnes of domestic cargo in 2020[48] and serving demand from England as the shortest ferry trip between Great Britain and Northern Ireland. Cairnryan – Belfast is also the second busiest passenger ferry route between Great Britain and the island of Ireland, with 1.3 million passengers annually[49].

Opportunities for Improvement

The A75 and A77 both serve the ports at Cairnryan and are both primarily single carriageway roads despite the ports being the primary point of access for freight traffic between Northern Ireland and Great Britain. Around two-thirds of freight traffic entering through this gateway travels via the A75 and onward to England with about £46 million of goods per day being moved on this road alone[50].

Average speeds on the A75 and A77 are lower than several other Scottish trunk roads, with both being primarily single carriageways[51]. Since these roads are not dual carriageways, there are low speed limits and congestion as the roads pass through several towns and villages. HGVs are limited to a maximum of 40mph on single carriageway roads in Scotland, increasing congestion and the likelihood of platooning which is a particular issue as the disembarkation of HGVs from ferries arriving from Northern Ireland occurs in waves.

Safety appears to be an issue on these routes with the proportion of collisions in which people have been killed or seriously injured being higher than the average in Scotland for similar routes[52]. Some points, such as the junction of the A75 and A751, are perceived as collision 'hotspots' by stakeholders[53].

The lack of alternative routes leads to the risk of long diversions in the event of a closure. Transport Scotland data, for selected closures on the A75, show that the diversionary route between Cardoness Castle and Calgow increases journey times from 20mins to 2hrs 40mins. This results in reduced reliability for freight and passenger traffic travelling to and from the ports of Cairnryan.

Stakeholders raised the issues on the A75 and A77 with the Review repeatedly. In addition to engagement carried out by the Review, Transport Scotland undertook a series of stakeholder engagements during its *South West Scotland Transport Study*, which identified similar issues including carriageway quality and the lack of overtaking opportunities[54]. This Scottish Government study also identified that there was some reluctance from businesses to invest in the area if connections to other parts of the UK were not improved[55].

Transport Scotland has delivered several local improvements to these roads in the past ten years, although significant capacity and journey time constraints remain. The Scottish Government are continuing to review the need for additional improvements on these roads with a further report due to be published in the Autumn. They have previously spoken publicly of the need for a proportionate approach to investment on the A75 reflecting the needs of local communities[56]. However, these roads are strategic transport connections and deserve appropriate investment to support this status.

Due to the nature of devolution and the fact that the majority of strategic benefits of improvements to the A75 would fall outside of Scotland, despite the cost resting wholly with the Scottish Government, the Review believes that the UK Government should make a commitment to support a significant upgrade to this route. The Review also encourages the Scottish Government to improve the A77 to support journeys between Belfast, Glasgow, and Aberdeen.

6 Recommendation

As a particularly poorly performing part of the proposed UKNET, and one which is critical for connectivity between Northern Ireland and the rest of the UK, the UK Government should:

Offer funding to support the upgrade of the A75 to improve journeys between Northern Ireland and Great Britain.

North Wales Corridor

Road links
Rail links

The **North Wales Coast Line** is a key route for communities and businesses to the North West of England, with rail connections for accessing Manchester and Liverpool Airports.

Manchester

Liverpool

Holyhead

There are approximately

2 million

rail journeys between Wales and North West England each year[57].

Journeys between North Wales and England account for the largest inter-regional flows in Wales at

204,000

journeys each weekday[58].

The area comprising North Wales and across to Liverpool and Manchester is a discrete economic area with significant interconnectivity and large numbers of daily cross border trips. A quarter of employees in this region cross the border between England and Wales for work[59].

It is a key route for communities and businesses with connections to Manchester and Liverpool Airports and the island of Ireland via Holyhead.

Sea passenger numbers between Holyhead and Dublin are the highest of the Irish Sea routes and the route also has significant freight crossings[60]. Access to and from Holyhead by the A55 is an important consideration for freight connectivity to and from Northern Ireland.

Stakeholders in North Wales regard capacity and journey times on the A55 as a significant barrier to growth, and slow rail journey speeds and low service frequencies mean that rail is not seen as a viable alternative.

Opportunities for Improvement

On the road network, there are high levels of traffic on the A55, M56, M6 and M60, with significant seasonal congestion on the A55. A recent study[61] found that the A55 becomes vulnerable and overstressed during incidents or significant road work events and lacks viable diversion routes.

Scheduling of ferries at Holyhead means that HGV traffic can come in waves, which can increase the chance of severe delays on the road.

There are several different infrastructure schemes in development to support improved resilience and capacity on the A55, although the recent announcement by the Welsh Government of a moratorium on new road schemes pending further environmental reviews may affect the delivery of these[62].

Improvements to line speeds and capacity on the North Wales Main Line and rail infrastructure in the Cheshire/Mersey area would enable faster journey times and capacity to support enhanced cross border economic links which will facilitate increased growth, jobs, housing and social cohesion.

The North Wales Main Line also needs to be better connected with HS2 at Crewe so that North Wales can take advantage of the benefits of HS2.

Stakeholders have also identified the potential benefits of electrification of the North Wales Main Line, including reduced carbon emissions which would support the UK's climate change-related commitments.

Transport for Wales and Growth Track 360 have been developing plans for a North Wales Metro and improvements to the North Wales Main Line. This includes line speed and capacity upgrades, upgrades between Wrexham, Bidston and Liverpool, enhancements to Chester Station, a Crewe Hub interface to maximise the benefits of HS2 and service amendments.

Noting that several different infrastructure schemes are already in development on this corridor and that, to date, these have been developed independently from each other, a more multi-modal approach would be desirable, to decide the best way to address the strategic needs of this corridor.

7 Recommendation

The UK Government should:

Work with the Welsh Government to undertake a multimodal review of the North Wales transport corridor, and develop a package of improvements focused on the North Wales Main Line (including better connectivity with HS2, and electrification), the A55, the M53, M56, and onward travel to and from the island of Ireland.
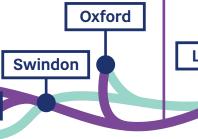
South Wales Corridor

Road links
Rail links

Each day there are approximately

80,000

crossings of the England Wales border on the **M4** alone[63] and two way flows are expected to **increase by**

70–80%

by 2041[64].

The **M4** is a key road link connecting Cardiff to other parts of the UK.

Milford Haven

Cardiff

Bristol

Swindon

Oxford

London

There are approximately

2.9 million

rail journeys
each year between Wales and South West England[65].

In the morning peak, the number of cross-border journeys starting in South East Wales is

70%

higher than the number of journeys that take place from South East Wales to other regions of Wales[66].

The South Wales Corridor is a strategically vital transport connection between London, Bristol, Cardiff and the major energy port at Milford Haven. It encompasses several major cities, transport hubs, airports and seaports and is used by thousands of cross-border travellers every single day.

On the rail network, Cardiff is well connected to London but is currently the UK's least well directly connected major city, with fewer direct services to other major UK cities[67]. The Review has made recommendations to improve Cardiff's connectivity through the Welsh Marches Corridor.

On the road network, the M4 is a strategically important route for accessing ports and large centres of population. In 2019, approximately 100,000 vehicles[68] crossed the Severn each day on the M4 and M48, corresponding with high levels of commuting between South Wales and England.

Opportunities for Improvement

Although the Great Western Main Line was recently electrified to Cardiff, with new trains and faster services, there is a peak congestion problem on the M4. This is due to high traffic volumes at peak times, especially associated with commuting[69].

The Welsh Government recently cancelled the proposed M4 relief road and instead instigated the *Burns Commission*[70] which has identified a package of proposed improvements in public transport to promote modal shift and reduce demand on the M4. The Commission identified that due to the flexibility of the car and the different types of journeys undertaken it was not possible for one single public transport option to provide an alternative. The Commission made a series of public transport recommendations as part of a multi-modal "network of alternatives".

The Commission assessed the capital cost of its recommendations at between £600 million and £800 million over ten years[71], significantly less than the £1.4 billion the M4 relief road was expected to cost[72].

This Review endorses the recommendations of the Burns report, most of which will fall to the Welsh Government to deliver. The impact of these interventions must be monitored to ensure that they have the desired impact on road congestion. The Welsh Government should retain the option to deliver improvements to the M4, including the proposed relief road, and revisit this decision if the improvements do not reduce congestion as expected.

The Severn crossings provide the main highway links between South Wales and England. Tolls on the Severn crossings ceased to be charged in December 2018 and their removal has increased traffic using the crossings which has increased congestion and journey times across the broader road network. This is particularly pronounced on the eastern side of the Severn crossing at the junctions of the M4, M5 and M32. National Highways is currently developing a package of possible improvements called the Severn Resilience Package which will seek to address these issues.

To maximise the potential benefits of the recommendations made by the Burns Commission and the proposed road improvements east of the Severn crossing, a multi-modal approach should be adopted, with collaborative working, to identify the best way to deliver these separate but related schemes. This should be done as a matter of priority, given the acute problems already being seen on this corridor.

8 Recommendation

The UK Government should:

Recognise the urgent need to reduce congestion on the M4 and adopt a multi modal approach to the South Wales corridor by upgrading and building new stations on the existing South Wales Main Line, supporting the Welsh Government's package of public transport improvements and removing bottlenecks through targeted improvements at the junction of the M4/M5 to relieve congestion.
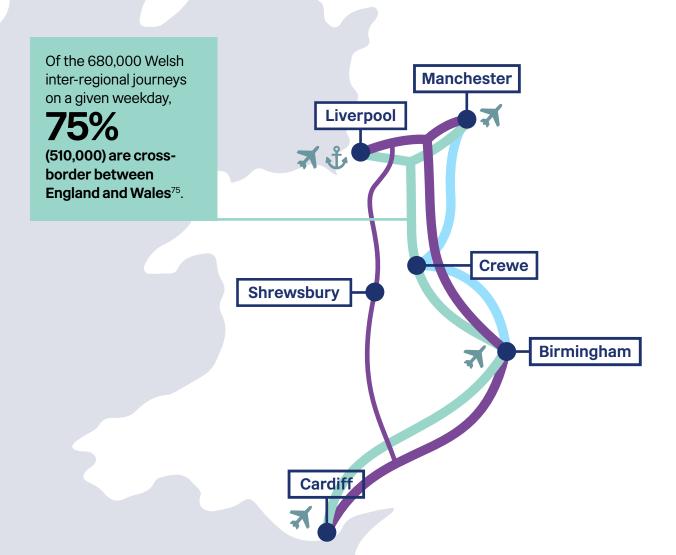
Access to UKNET

Cardiff Airport has poor public transport access with the nearest railway station being a 3.3km journey from the terminal. In 2019, private vehicles accounted for 87% of the surface access mode share to Cardiff Airport[73].

Public transport services to the airport are expected to be improved as part of the Cardiff Capital Regional Metro. The Welsh Government and industry are delivering this project in partnership to develop a multi-modal transit network. This will include new stations, routes and development of light rail and bus rapid transit[74].

Welsh Marches Corridor

Road links
Rail links
HS2 (under construction)
Regional road links

Of the 680,000 Welsh inter-regional journeys on a given weekday, **75% (510,000) are cross-border between England and Wales**[75].

Manchester

Liverpool

Crewe

Shrewsbury

Birmingham

Cardiff

The border between Wales and England is porous with many key roads and the Welsh Marches railway line crossing the border repeatedly. At the time of the 2011 census, almost 76,000 people were crossing from Wales to England for work daily with over 44,000 going from England to Wales[76], while many trips between South and North Wales involve travelling via England. The Welsh Marches railway line and the A49 provide key connections between South and North Wales.

Opportunities for Improvement

Rail journey times are relatively long and capacity is limited between Cardiff and Birmingham. Of the major cities in Great Britain, Cardiff has the fewest direct rail connections to the others[77].

Improvements to the quality and range of direct connections between Cardiff and other major regions, such as Yorkshire and North East England would enhance the connectivity of the Welsh capital.

9 Recommendation

The UK Government should:

Develop a package of railway improvements to increase connectivity and reduce journey times between Cardiff, Birmingham and beyond, which could include better rolling stock, timetable changes and enhanced infrastructure.
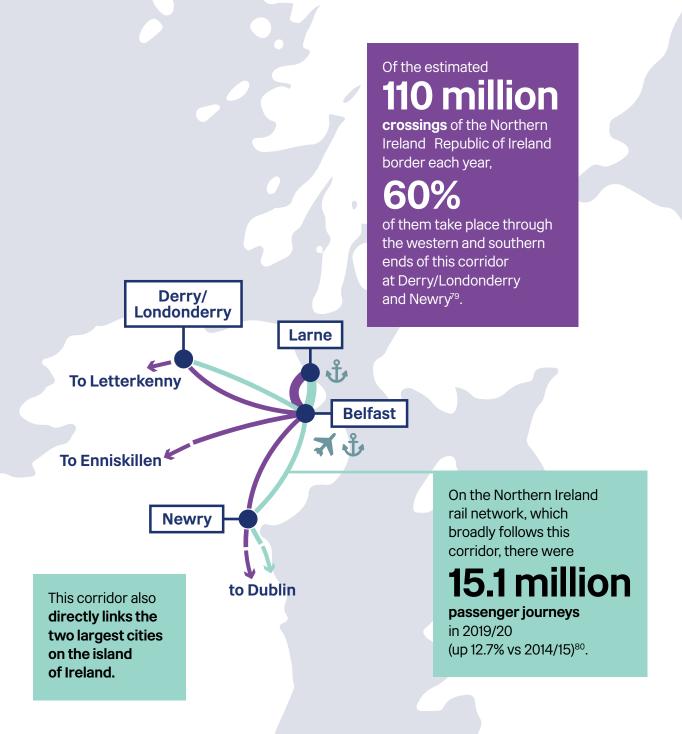
Access to UKNET

The Cambrian Main Line running from Aberystwyth through to Shrewsbury and then onward to Birmingham is important for connectivity for communities in Mid Wales accessing England. The Review supports further frequency and capacity improvements to improve connectivity between Mid Wales and the Midlands.

The A49 is important for north-south connectivity through the Welsh Marches while the A5, A458 and A483 provide strategic links between Mid Wales, Shropshire and the West Midlands. The Review would support any improvements to the capacity and reliability of these roads given their importance for gaining access to the proposed UKNET.

The Pant-Llanymynech bypass was raised by numerous stakeholders and is important for cross-border connectivity in Mid Wales. The Review welcomes the inclusion of the scheme in the pipeline of potential schemes for the third *Roads Investment Strategy*[78].

Northern Ireland Corridor

Legend:
- Road links
- Rail links
- Regional road links
- Regional rail links

Of the estimated **110 million** **crossings** of the Northern Ireland Republic of Ireland border each year, **60%** of them take place through the western and southern ends of this corridor at Derry/Londonderry and Newry[79].

Derry/Londonderry

Larne

To Letterkenny

Belfast

To Enniskillen

Newry

to Dublin

This corridor also **directly links the two largest cities on the island of Ireland.**

On the Northern Ireland rail network, which broadly follows this corridor, there were **15.1 million** **passenger journeys** in 2019/20 (up 12.7% vs 2014/15)[80].

The Northern Ireland corridor connects the main economic and population centres of Northern Ireland with Belfast and Dublin. Northern Ireland is the only nation of the UK separated geographically from the rest of the UK and therefore relies on air and maritime connectivity to access Great Britain.

Economic activity with the rest of the UK is particularly important for Northern Ireland, accounting for half of the total inbound visitor expenditure[81] and half of the total external sales of goods and services[82] in 2019.

In 2017, 80% of the 2.7 million visitors to Northern Ireland arrived by air[83] and the economic contribution of domestic aviation to the Northern Ireland economy is estimated to be around £2 billion per annum[84] with air freight services being responsible for around 6% of all economic activity in Northern Ireland[85].

The Port of Belfast is also a key economic hub as it is the largest UK port for domestic freight, handling 12 million tonnes a year[86], with significant passenger and goods flows between Belfast and Cairnryan. As stated in the North Channel corridor section, the Review recommends the UK Government should offer funding to support the upgrade of the A75 to improve journeys between Northern Ireland and Great Britain via the ports at Cairnryan.

Northern Ireland is unique in that it shares a land border with a country in the European Union. As such, some elements of transport connectivity and provision ought to be considered on an 'all-island' basis.

Opportunities for Improvement

People in Northern Ireland are heavily reliant on cars to travel. The Belfast–Dublin and the Derry/Londonderry–Dublin corridors require improvements to enhance north-south connectivity and to support onward travel to Great Britain via Republic of Ireland seaports. The A5 is of particular importance for northwest-south connectivity and requires a significant upgrade. This is planned but has been delayed by legal challenges meaning that construction is also likely to be delayed[87].
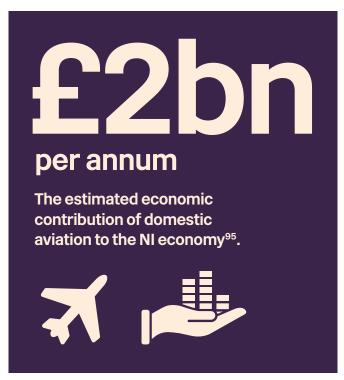
Public transport in Northern Ireland has experienced decades of underinvestment[88], leaving some elements of public transportation unable to adequately meet current and potential user needs and this contributes to the reliance on private rather than public transport[89]. Northern Ireland has a less extensive rail network than many regions and nations of the UK.

In 2017/18, local transport and rail in Northern Ireland received funding of £84 per head, the lowest of all the nations of the UK, and at 27% of the UK average expenditure[90]. The Northern Ireland Executive has recognised the impact of this historic funding gap and the Union Connectivity Review expects to see plans on how this will be addressed in the forthcoming *Investment Strategy for Northern Ireland*[91].

The *Regional Development Strategy 2035*[92] and the *Regional Strategic Transport Network Plan*[93] identify the strategic transport network in Northern Ireland and the need to improve essential gateways and cross-border links. This highlights the importance of the strategic transport network and that a level of investment is needed to support it.

However, addressing legacy funding issues will not be a quick nor easy fix. In addition to long-term planning and funding, people will need to feel that public transport options are fast, affordable, safe, modern and—crucially—available for the journeys they make. This will require the Executive to coalesce around a long-term transport infrastructure pipeline with the backing of the UK Government to provide confidence that funding will be available to deliver it.

80%
of 2.7m visitors

to Northern Ireland arrived by air in 2017[94].

£2bn
per annum

The estimated economic contribution of domestic aviation to the NI economy[95].

10 Recommendation

The UK Government should:

Support the Northern Ireland Executive to develop, fund and implement a long term pipeline of improvements to transport infrastructure.

Northern Ireland has suffered historical underinvestment in its rail network and services can be sparse, slow and infrequent. Northern Ireland is also the only region in the UK that does not have any railway electrification.

The northwest of Northern Ireland is particularly poorly served by rail, and this is even more apparent when compared with connections to and from the south of the island. Passengers can travel from Belfast to Dublin by train in just over two hours while it takes about the same time to travel between Belfast and Derry/Londonderry[96] despite being a significantly shorter distance. It is twice as fast to travel by road between Belfast and Derry/Londonderry than by rail.

Over three million journeys were made on the Derry/Londonderry railway line in 2019[97] showing a clear demand for good transport links to and from this region. The Review welcomes initiatives aimed at improving connectivity in the northwest of Northern Ireland including the feasibility study commissioned by the Northern Ireland Department for Infrastructure to increase service frequencies to half-hourly on the Derry/Londonderry to Belfast railway line[98].

Since the 1950s, the Northern Ireland rail network has been cut from 754 to 297 miles[99]. Many communities remain isolated from the rail network following the closure of their local railway line or station more than five decades ago.

In early 2020, the UK Government launched the £500 million *Restoring Your Railway Fund*[100] to support communities in England and Wales to develop proposals to reinstate axed local services and restore stations. No such scheme exists in Northern Ireland despite the clear need for better railways and miles of former rail corridors.

11 Recommendation

The UK Government should:

Agree with the Northern Ireland Executive a plan and funding to upgrade the railway on the Northern Ireland corridor, including better connectivity to the three airports and the seaports, and to and from Belfast and Derry/Londonderry and examine the potential to reopen closed lines.

Cross-border connections to the Republic of Ireland are key with almost 300,000 border crossings being made every weekday[101]. Improved cross-border connectivity would strengthen economic links and build competitiveness across the whole island of Ireland.

As highlighted above, the unique circumstances of Northern Ireland mean that it is essential for the Northern Ireland Executive and the UK Government to work closely with the Republic of Ireland to plan, develop and implement a strategic approach for transport connectivity that supports cross border travel and journeys to and from England, Scotland and Wales.

The Review particularly notes the positive opportunity provided by the *All-Island Strategic Rail Review*[102] which results from commitments made in the New Decade, New Approach Deal. This Review will consider how best to improve regional and strategic rail connectivity across the island of Ireland and is a joint piece of work by the Northern Ireland Executive and the Irish Government.

The *All-Island Strategic Rail Review* will seek to address many of the key issues identified by the Union Connectivity Review in support of growth, jobs, housing and social cohesion. The UK Government should support the Northern Ireland Executive to deliver transport infrastructure recommendations resulting from this work.

12 Recommendation

The UK Government should:

Provide funding and major project expertise to the Northern Ireland Executive to support their work with the Republic of Ireland relating to the *All Island Strategic Rail Review* and its implementation, including connectivity between Belfast and Dublin, between Derry/Londonderry and North West Ireland, and to and from the three airports and the seaports.
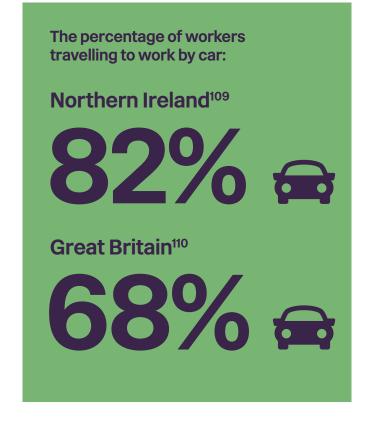
Access to UKNET

Northern Ireland's airports are key transport infrastructure nodes; the *Regional Development Strategy*[103] has identified them as strategically important transport interchanges vital for economic development, freight distribution and employment generation.

Despite this, surface access options to Northern Ireland's airports are limited with no convenient railway stations at any of Northern Ireland's airports even though each has a railway line within close proximity. The result of this is that car travel is the dominant way for people to travel to airports in Northern Ireland[104]. In 2019, access by car and taxi accounted for around 90% of all surface access mode share at both Belfast airports whereas rail mode share was in the region of 0.5%[105]. There are also no rail stations at any of Northern Ireland's seaports.

In addition to poor public transport mode shares for access to airports, just 6% of workers commute using public transport whilst 82% travel to work by car[106], the highest of any UK region. When travelling to work in Great Britain, public transport is used by 18% of workers and just 68% of workers commute by car[107].

The Review welcomes the inclusion of direct rail connections to Northern Ireland's airports and seaports within the remit of the *All-Island Strategic Rail Review*[108].

The percentage of workers commuting using public transport:

Northern Ireland

6%

Great Britain

18%

The percentage of workers travelling to work by car:

Northern Ireland[109]

82%

Great Britain[110]

68%

3

Part 3
Strengthening the network

Strengthening the network

Aviation

Domestic aviation is particularly important for Northern Ireland and the more northern regions of Scotland and is also key for connecting to international travel. Airports have been identified as key elements of UKNET and support for aviation connections to these transport hubs is essential for the successful operation of UKNET.

Domestic aviation has suffered from some significant challenges in recent years with the collapse of Flybe and Stobart Air creating real difficulties for people seeking to travel domestically in the UK. This has been compounded by the COVID-19 pandemic which has drastically reduced short-term demand for domestic flights, reducing the frequency of services and the number of routes and putting more airlines at risk of severe financial difficulties, particularly while the long-term implications of the pandemic are uncertain.

While domestic air travel accounts for only 1.2% of total domestic transport emissions[111], it is a significant polluter when considered on a per journey basis. Journeys between London and Glasgow by plane will produce more than five times as many greenhouse gas emissions per passenger than the equivalent journey by rail[112]. Decarbonising the sector will be a significant challenge relative to other sectors due to the technical challenges and uncertainty of zero-emission flight and because of an expected increase in passenger demand[113].

The Review recognises the need to support domestic routes for which there is not a suitable rail or road alternative, whilst balancing this with strategies to decarbonise the aviation sector and support the UK Government's climate ambitions.

✈ Top 10 domestic passenger air routes in 2019

Route	Passengers
Heathrow–Edinburgh	1,196,921
Heathrow–Glasgow	865,008
Gatwick–Edinburgh	731,793
Heathrow–Aberdeen	692,289
Heathrow–Belfast City (George Best)	668,575
Gatwick–Glasgow	641,566
Stansted–Edinburgh	618,628
Gatwick–Belfast Int.	581,909
Stansted–Belfast Int.	572,832
Heathrow–Manchester	554,201

Public Service Obligation Routes

There are air routes in the UK that are critical for UK-wide connectivity, but which may not be commercially viable due to insufficient demand. The UK Government and the devolved administrations can choose to support these routes through 'public service obligation' (PSO) arrangements which provide financial subsidies to enable airlines to operate these without making a loss.

Current rules only allow for these PSOs on a restricted basis[114]. This means that only routes which run to and from London and are exclusively operated by one airline are eligible for support, which limits their extent, consumer choice and competition. The UK Government does not currently provide financial support for routes that do not operate to or from London. The devolved administrations have the ability to support PSO routes that are contained wholly within their nation, as the Scottish Government has done extensively. Routes from another nation of the UK to and from England fall under the existing UK guidance.
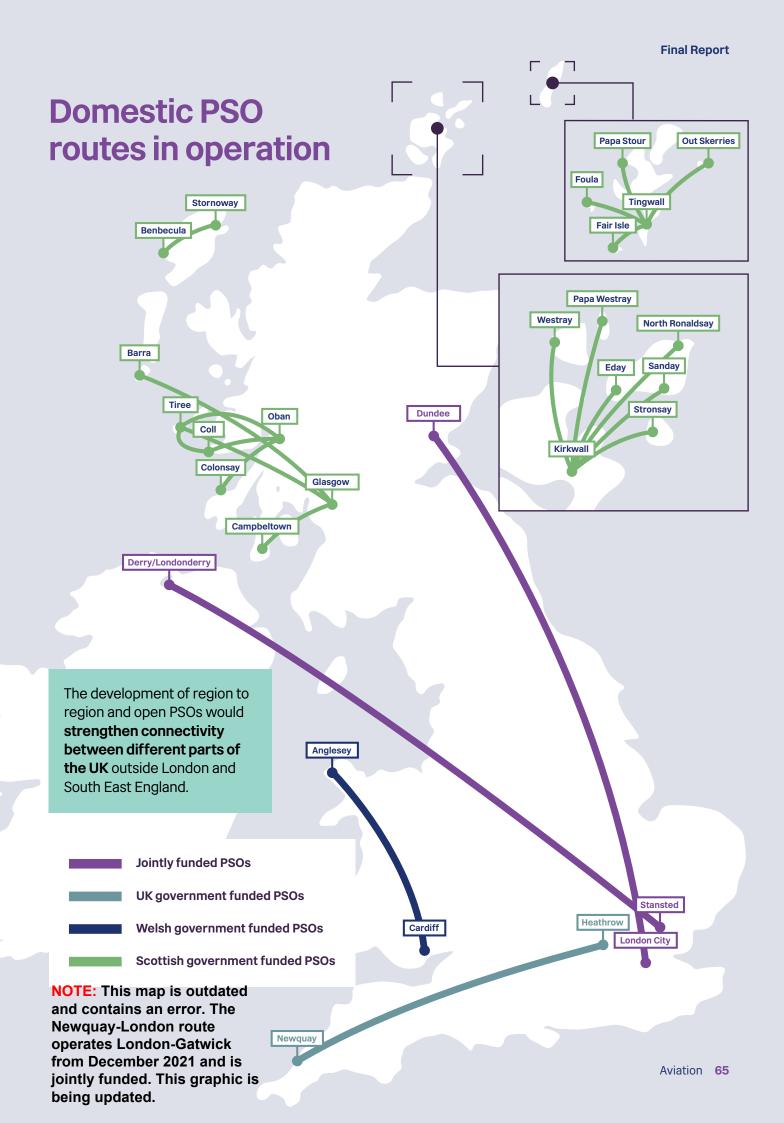
A majority of aviation stakeholders highlighted the current PSO guidance as a barrier to improving UK wide connectivity. All called for the revision of the guidance to allow for the development of open PSOs which would support specific routes by removing APD and allowing multiple airlines to operate, enabling competition for services. As these routes may not otherwise have been operated there would be no subsequent loss in tax revenue from the removal of APD. Stakeholders have also called for the development of region to region PSOs which would operate between regions outside of London.

There is thus an opportunity for the UK Government to support the aviation industry by liberalising the approach to PSOs. The development of region to region and open PSOs would strengthen connectivity between different parts of the UK outside London and South East England, providing greater benefits for regions with lower levels of productivity and supporting the UK Government's levelling up agenda.

13 Recommendation

Where journeys are too long to be reasonably taken by road or rail, the UK Government should:

Revise existing subsidy rules for domestic aviation to allow support for routes between different regions of the UK (rather than just to and from London) and to allow multiple airlines to serve a single route.

Domestic PSO routes in operation

Stornoway
Benbecula
Barra
Tiree
Coll
Oban
Colonsay
Glasgow
Campbeltown

Papa Stour
Out Skerries
Foula
Tingwall
Fair Isle

Papa Westray
Westray
North Ronaldsay
Eday
Sanday
Stronsay
Kirkwall

Dundee

Derry/Londonderry

The development of region to region and open PSOs would **strengthen connectivity between different parts of the UK** outside London and South East England.

Anglesey

Stansted
Heathrow
London City
Cardiff
Newquay

Jointly funded PSOs

UK government funded PSOs

Welsh government funded PSOs

Scottish government funded PSOs

NOTE: This map is outdated and contains an error. The Newquay-London route operates London-Gatwick from December 2021 and is jointly funded. This graphic is being updated.

Air Passenger Duty

Air Passenger Duty (APD) makes flying domestically disproportionately more expensive than flying internationally as the tax is imposed on both the outbound and inbound legs of domestic flights. This was raised by stakeholders as an economic barrier to domestic travel, particularly for travel to and from Northern Ireland and other regions without viable road and rail alternatives.

APD has a disproportionate impact on connectivity to Northern Ireland due to its reliance on aviation for connectivity with Great Britain and because the region shares a land border with the Republic of Ireland which does not levy an equivalent tax on any flights[115].

In the call for evidence, the imposition of APD has been cited as a barrier for securing new routes into Northern Ireland, given that airlines can establish routes in the Republic of Ireland without applying the tax and many people living in Northern Ireland can access Dublin Airport easily and relatively quickly. In 2019, 26% of all people in Northern Ireland flying to European destinations flew via Dublin. This figure is even higher for destinations in the USA (70%), Canada (74%), India (67%) and the rest of the world (48%)[116].

In the interim report, published in March 2021, the Review identified the need for the UK Government to consider domestic APD and its impact on domestic aviation. HM Treasury subsequently launched a consultation[117] on the potential reform of aviation tax with a particular focus on amending APD for domestic flights.

The UK Government is seeking to ensure that aviation tax supports domestic and international connectivity, aligns with the UK's environmental commitments and enables the aviation sector to make a fair contribution to public finances. APD is currently the principal tax on aviation. The Review welcomes HM Treasury's commitment to reviewing domestic APD.

The UK Government's preferred option for the reform of aviation tax is to introduce a new APD band for domestic flights, where the rate of APD would be lower than the shortest international band. This is seen as a less complex solution than a return leg exemption which has also been proposed[118].

APD is set at a higher rate on flights of more than 2000 miles but in the context of UK domestic aviation, where no routes exceed this distance, there is no difference in the rate of APD between longer and shorter flights[119]. There is no link to carbon emissions from domestic aviation and the tax does not account for the efficiency of an aircraft so should not be considered as an environmental tax.

Stakeholders have suggested that the creation of a second-leg exemption from APD for domestic flights would support the industry in recovering from the impact of the COVID-19 pandemic and would bring domestic flights in line with international ones. An alternative is to replace APD with a per plane tax based on an aircraft's emissions although this was explored by the coalition government in 2010 and found to be legally difficult. It is worth noting though that the UK Government has previously stated that revenues from a per plane tax would be around £520 million higher than the equivalent revenues from APD in 2010–11[120].

The UK Government's consultation on aviation tax will consider these issues in detail but the Review encourages the UK Government to fully consider the need to vary APD for routes where there are no reasonable road or rail alternatives.

14 Recommendation

Where journeys are too long to be reasonably taken by road or rail, the UK Government should:

Reduce the rate of domestic aviation tax.

Domestic Connectivity at London Airports

Domestic connections to and from London airports have significantly reduced over time and these slots have been taken by international connections. In 1990, there were 18 domestic routes served from Heathrow compared to 7 in 2015[121] and a similar reduction has been seen at all other London airports apart from London City[122].

This lack of slot capacity has led to consolidation among airlines, reducing frequency and competition on domestic routes.

This issue was identified by aviation stakeholders as a key obstacle to improving domestic connectivity between other parts of the UK and London.

There is an opportunity for the UK Government to adopt a more interventionist approach to slot assignment at London airports in support of domestic routes where there is not a viable road or rail alternative.

15 Recommendation

Where journeys are too long to be reasonably taken by road or rail, the UK Government should:

Intervene in the assignment of slots at London airports to provide more slots for domestic routes.

Reduction in domestic routes since 1990

Heathrow[123]

18 → **7**

1990   2015

Stansted[124]

35 → **27**

1990   2019

Luton[125]

27 → **13**

1990   2015

Gatwick[126]

19 → **11**

1990   2019

Decarbonisation and the Future of Flight

In July 2021, the Department for Transport published the *Jet Zero Consultation: a consultation on our strategy for net zero aviation*[127], alongside the *Transport Decarbonisation Plan*[128]. This includes the ambition to have zero-emission routes connecting different parts of the UK by 2030 and a commitment to assess the feasibility of serving PSO routes with low carbon aviation. The Review welcomes the commitments made in both publications to accelerate the uptake of sustainable aviation fuels (SAFs) and develop low and zero-emission aircraft.

The Department for Transport is supporting the *FlyZero project*[129], which will set out a plan for how the UK can contribute to a zero-emission aircraft by 2030. The UK Government should consider domestic routes as strong candidates for part-electrified aircraft and SAFs since the engineering challenges are less pronounced for smaller planes and shorter routes[130].

For domestic and short-haul flights, SAF will be a stepping-stone to zero-emission aircraft and the UK Government is currently consulting on policies that could see jet fuel comprise up to 10% SAF by 2030 and up to 75% SAF by 2050[131].

The UK Government's *Green Fuels, Green Skies*[132] competition is providing £15 million in 2021-22 to support the early development of SAF production plants in the UK. In July 2021, the UK Government announced eight projects in England and Wales that have been shortlisted for a share of this funding[133]. The competition was open to the whole of the UK, but no proposals were received from companies in Northern Ireland.

There is a key opportunity to establish a SAF plant in Northern Ireland, given the importance of aviation for Northern Ireland's connectivity with Great Britain. Agriculture is a major sector of the Northern Ireland economy[134] and could support production since biomass sourced from agricultural residues or certain crops[135] can be used as feedstock. SAF can also be produced using hydrogen technology which is currently being explored in Northern Ireland through initiatives such as Northern Ireland's Department for Infrastructure's £66 million programme for zero and low-emission buses[136] and Northern Ireland Water's development of a one-megawatt electrolyser at a wastewater treatment works[137].

Having SAF plants in those parts of the United Kingdom that are particularly reliant on aviation for domestic connectivity could support the decarbonisation of the domestic aviation sector in the medium term.

16 Recommendation

The UK Government should:

Drive the uptake of sustainable fuels and zero emission technologies on domestic aviation through a combination of incentives, tax benefits and subsidies to make the UK a world leader in developing these fuels and technologies.

17 Recommendation

The UK Government should:

Support the development of sustainable aviation fuel plants in parts of the United Kingdom that are particularly reliant on aviation for domestic connectivity.

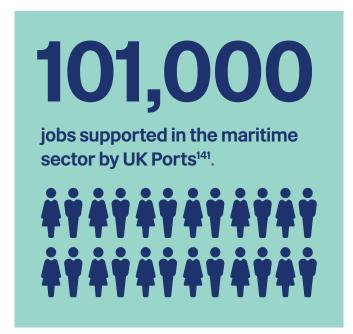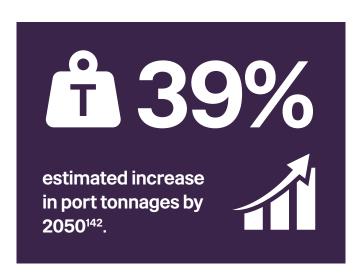## Strengthening the network
Maritime

Ports and the goods that go through them are strong drivers of national and local growth and better connectivity to these vital economic hubs presents an opportunity for growth, jobs, housing and improved social cohesion.
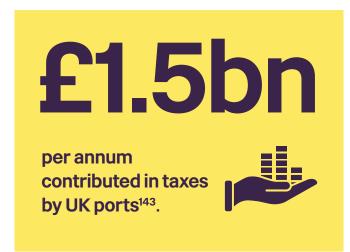
Domestic freight accounts for 19% of all traffic handled by UK ports, totalling 92 million tonnes[138]. Most of this traffic moves from one point in the UK to another, although some is also destined for offshore destinations such as oil rigs. A significant portion of domestic freight moves across the Irish Sea to and from Northern Ireland, with Belfast being the largest UK port for domestic sea freight[139].

The challenge of connecting ports to the wider transport network was one of the key themes identified by respondents to the Review's call for evidence. The capacity and resilience particularly of the A75 and also of the A77 were raised multiple times by different stakeholders. Other issues identified by stakeholders included a need to improve rail connectivity to ports for freight and increasing the UK rail freight gauge to W12, where possible, to support the movement of deep-sea shipping containers.

500m

tonnes of freight a year handled by UK ports[140].

101,000

jobs supported in the maritime sector by UK Ports[141].

39%

estimated increase
in port tonnages by
2050[142].

£1.5bn

per annum
contributed in taxes
by UK ports[143].

Planned Investment

Port connectivity is recognised as being of importance by the UK Government and the devolved administrations. In England, the UK Government is already undertaking significant work with key road and rail schemes being delivered. These include the improvements to the A160 and A180 to support the Port of Immingham, the development of the A5036 to improve access to the Port of Liverpool[144] and £235 million has been invested directly into growing rail freight over Control Period 5 (2014–19) through the *Strategic Freight Network Fund*[145].

The Welsh Government have committed to consider ports as part of a wider integrated approach to transport planning and *Llwybr Newydd: The Wales Transport Strategy 2021*[146] commits to promoting modal shift to domestic maritime.

Port connectivity has been recognised as a priority by the Northern Ireland Executive and, as stated earlier, it will be considered as part of the *All-Island Strategic Rail Review*.

The UK Government has recently announced the creation of a series of freeports in England and seeks to encourage their establishment in all the nations of the UK. These will aim to promote trade to generate local growth. It is important that these are adequately connected to the proposed UKNET and as such have been identified as key economic hubs by the Review.

18 Recommendation

The UK Government should:

Improve connectivity to seaports across the United Kingdom by enhancing rail freight connections and maximise the potential of freeports by investing in improved connectivity to and from these economic hubs.

Although this report only provides a detailed overview of those corridors particularly relevant to Union connectivity the Review recognises that other corridors are particularly important for ports and freight and for onward travel. These include cross country routes from Liverpool to the Humber region and from Southampton to the 'Golden Triangle'.

The focus of the Review is on strategic UK connections and the terms of reference do not extend to lifeline or regional services. However, the Review acknowledges the issues faced by communities living in remote areas, many of whom rely on maritime travel to access jobs and services and to meet friends and family. Several stakeholders have raised concerns about the reliability, frequency and capacity of ferry connections to and from the Scottish islands, and to and from the Isle of Wight. The Review welcomes the Scottish Government's recent *National Transport Strategy Delivery Plan*[147], which included £580 million of proposed funding to support improved island connectivity.

Clean Maritime

Maritime transport is currently the most carbon-efficient way to move freight and people. However, due to the volume and scale of the industry, domestic shipping produces more greenhouse gas emissions than the bus and rail sectors combined[148]. This will have to be reduced if the UK is to achieve its net zero targets.

Domestic shipping is particularly suitable for low carbon shipping as technologies, such as battery systems, are already able to power these shorter journeys[149]. The recent Maritime 2050 plan[150] sets out the UK Government's ambition to see an increase in shipping between different points in the UK. The UK Government has recently announced the creation of a dedicated unit within the Department for Transport to support the development of clean maritime technologies[151].

Strengthening the network

The Environment

The recently published *Transport Decarbonisation Plan*[152] sets out a vision to drive down carbon emissions across all modes, encourage modal shift and promote clean, place-based solutions that meet the needs of local communities.

The development and implementation of the network can help the UK Government achieve the goals outlined in the *Transport Decarbonisation Plan* by supporting a multi-modal approach to transport planning and providing low carbon journey options.

Last-Mile Journeys

One of the key themes from the call for evidence was for the Review to consider the role of active travel i.e. walking and cycling, as part of journeys across the UK.

The UK Government has already set out a substantial investment to increase active travel which aims for half of all journeys in towns and cities to be cycled or walked by 2030[153]. It also plans to deliver a world-class cycling and walking network in England by 2040[154]. This will be increasingly important as the UK continues to recover from COVID-19 and people begin to make more journeys.

The Scottish and Welsh Governments are also making positive commitments to support active travel. In Wales, the *Active Travel Act* requires local authorities to continuously improve facilities and routes for pedestrians and cyclists[155], whilst in Scotland, the *Active Travel Framework*[156] established by Transport Scotland is enabling passengers to change their travel patterns and prioritise methods of transport that are better for their health and the environment. Northern Ireland has ambitious plans for active travel, including an ambitious cycling strategy aimed at putting bikes at the centre of everyday journeys[157].

Buses are central to the public transport network, facilitating more than twice as many journeys as railways in 2019[158]. Buses provide a vital lifeline for people to stay connected to others in their communities, to access local jobs and services, and—importantly—to access transport hubs as a single stage of a longer journey.

The UK Government already aims to deliver its National Bus Strategy[159] and bring about a green bus revolution with 4,000 new zero-emission buses and the infrastructure needed to support them. It also sets out plans for a consultation on a phase-out date for the sale of non-zero-emission buses[160]. The Scottish Government has already outlined its Bus Partnership Fund to enable local authorities to deliver ambitious schemes to increase bus usage[161]. In Wales, the Welsh Government has set out its ambitions to move people away from car journeys and toward buses and to drive down net emissions from its fleet of buses[162]. Northern Ireland has managed to increase bus patronage at a time when it has been in decline in the rest of the UK[163].

Protecting the Natural Environment

The UK Government has already set out its 25-year plan for the environment[164]. It is the UK Government's stated goal to be the first generation to leave the environment "in a better state than we found it" and to take an active net-positive approach to the environment.

To support more proactive protection of the environment, National Highways has recently begun to plant native wildflower species along the verges of new large-scale road projects[165]. Under this policy, National Highways contractors will be obliged to create conditions along verges for species-rich grassland to thrive using low fertility soils. The verges will then be allowed to regenerate naturally or be seeded with wildflowers. This thinking has also been demonstrated in Network Rail's *Green Transport Corridors* programme, whereby vegetation alongside railway lines will be managed more effectively for biodiversity gain[166]. Transport Scotland similarly has developed a policy statement to balance[167] building of roads with the landscape management of new transport corridors. Transport for Wales has set out an ambitious *Biodiversity Action Plan* that looks to protect Wales' beautiful natural environment[168]. This kind of cultural shift in thinking will help the natural environment for years to come.

The Review welcomes all these initiatives and encourages the UK Government and transport bodies throughout the UK to do everything possible to continue to put environmental protection at the heart of future planning.

Decarbonisation of Road and Rail

The UK Government aims to deliver a net-zero railway network by 2050, with sustained carbon reductions in rail along the way[169]. It has already set out its ambition to remove all diesel-only trains from the network by 2040 and at the same time deliver a programme of electrification guided by Network Rail's *Traction Decarbonisation Network Strategy*[170]. The UK Government has also signalled its future exploration of hydrogen technologies, which has the potential to decarbonise energy-intensive vehicles like HGV lorries and trains[171].

The UK Government has also announced its intention to end the sale of petrol and diesel vehicles by 2030[172] while the Scottish Government's *Climate Change Plan* also supports the ongoing uptake of electric vehicles[173]. The Welsh Government has pledged that by 2025, all users of electric vehicles across the country will be confident they can access charging infrastructure when and where they need it[174].

However, the current distribution of the UK electric vehicle charging network is unequal, with some areas such as Northern Ireland and Yorkshire being particularly underserved[175]. In response to this, the UK Government's plans to publish an *Electric Vehicle Infrastructure Strategy* later this year which will set out an action plan for infrastructure rollout[176].
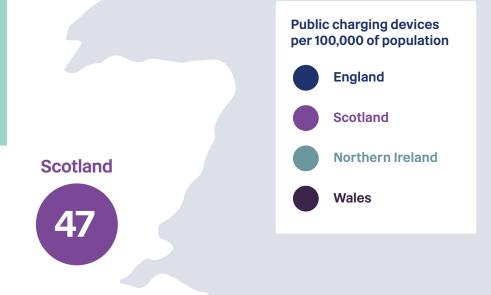
In many cases, it will fall to local authorities and the devolved administrations to manage the rollout of this vital infrastructure. Practical and financial support from the UK Government would enable them to deliver a better provision of charging infrastructure to do this better and sooner. UKNET should be prioritised in this rollout to reduce range anxiety and support the sustainable movement of people and goods across the country.
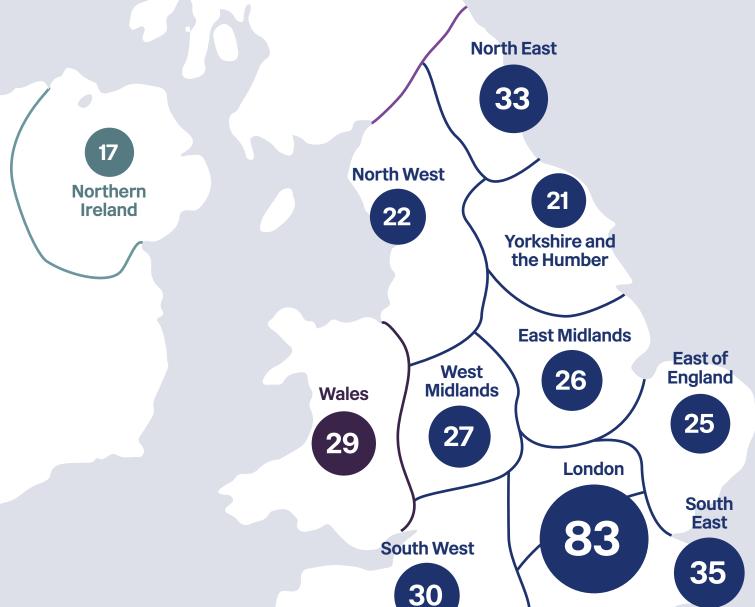
19 Recommendation

The UK Government should:

Maintain high environmental standards on UKNET such as the better provision of electric vehicle charge points, the protection of the natural environment and integration with local active travel schemes and sustainable local transport options.

There is a **notable disparity in the distribution of EV infrastructure across the UK**, with Northern Ireland in particular experiencing a scarcity of chargepoints.

Public charging devices per 100,000 of population

- England
- Scotland
- Northern Ireland
- Wales

Scotland
47

Northern Ireland
17

North East
33

North West
22

Yorkshire and the Humber
21

East Midlands
26

East of England
25

Wales
29

West Midlands
27

London
83

South East
35

South West
30

Strengthening the network

Freight

The capacity, connectivity and reliability of the transport network is key to the free movement of goods and supply chains across the country. Freight in the UK is integrated across the borders of England, Scotland, Wales and Northern Ireland—reflecting the single market—and therefore infrastructure improvements in one part of the UK will contribute to the resilience and benefits of another part of the UK.

Freight is essential to the success of the UK, comprising over 200,000 businesses which contribute a total of £127 billion in gross value added to the economy[177]. The COVID-19 pandemic emphasised the importance of delivering goods quickly and efficiently across all four nations as demand significantly increased and supply chains were disrupted.

In 2019, 196 billion tonne-kilometres of domestic freight was moved within the UK: 79% by road, 13% by water and 8% by rail[178]. UK airports handled 2.5 million tonnes of freight throughout 2019[179], most of which is then moved on the road network.

In April 2019, the National Infrastructure Commission published *Better Delivery: the challenge for freight*[180]. The study found that through the adoption of new technologies, industry-wide engagement and the recognition of freight's role within the transport and planning system, it is possible to decarbonise road and rail freight by 2050 and tackle capacity and congestion challenges. Key recommendations included establishing a freight data standard, an industry-wide leadership council and local planning guidance.

In response to this report, the UK Government will publish a *Future of Freight* strategic plan by the end of 2021[181].

This Review has already identified a series of infrastructure improvements that will support the development of road and rail freight on the proposed UKNET. For instance, there is already strong collaboration between National Highways and Network Rail in England to develop common views of the freight markets on individual corridors and interventions such as rail capacity upgrades, rail gauge enhancements and road improvements.

Part 4

Conclusion

After the Review

This is the final report of the Union Connectivity Review. It has sought the views of stakeholders and the general public in England, Scotland, Wales and Northern Ireland, assessed current transport provision and identified where there are opportunities to improve connectivity in support of economic growth, jobs, housing and social cohesion.

A recurring theme in stakeholder feedback has been the importance of getting transport right and ensuring an appropriate level of investment to facilitate this. Stakeholders were also vocal about not allowing internal administrative borders to prevent this from occurring.

The Review has identified gaps in the approach to pan-UK transport planning and investment. It has identified specific infrastructure upgrades that would improve journeys between the nations of the UK and identified several different policy areas where UK Government intervention could improve connectivity.

In response to these issues, the Review has made a series of substantive recommendations and it is now for the UK Government to consider these and decide how to take them forward.

Acknowledgements

Sir Peter would like to extend his gratitude to the following organisations that gave up their time to support the Union Connectivity Review:

Aberdeen City Council

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Airlines UK

Airport Operators Association

All-Party Parliamentary Group on Infrastructure Association

Antrim and Newtown Abbey Council

Armagh City, Banbridge and Craigavon Borough Council

Avanti West Coast

Banbridge and Craigavon Borough Council

Belfast City Council

Belfast International Airport

Blaenau Gwent Council

British Chamber of Commerce

British Ports Association

Caerphilly Council

Campaign for Borders Rail

Cardiff Region City Deal

Cardiff Council

Carmarthenshire Council

Ceredigion Council

Chartered Institute of Highways and Transportation

Chartered Institute of Logistics and Transport

Comhairle nan Eilean Siar

Confederation of British Industry

Cross Country Trains

Dumfries and Galloway Council

East Lothian Council

Eastern Airways

EasyJet

Federation of Small Businesses

Gatwick Airport

Glasgow City Council

Great Western Railway

Greengauge 21

Heathrow Airport

Highlands and Islands Airports Limited

International Airlines Group

Liverpool City Council

Logan Air

Logistics UK

London North Eastern Railway

Maritime UK

Mayor of Cambridgeshire and Peterborough

Mayor of Greater Manchester

Mayor of London

Mayor of North of Tyne

Mayor of West England

Mayor of West Midlands

Mersey Maritime

Mid and East Antrim Borough Council

Midlands Connect

Midlothian Council

Minister for Transport and the Minister for the Environment, Climate and Communications for the Republic of Ireland

Monmouthshire Council

Mourne and Down Council

National Highways (formerly Highways England)

National Infrastructure Commission

Neath Port Talbot Council

Network Rail

Newcastleton Community Trust

Newry, Mourne and Down

North Ayrshire & Solace Council

North East Combined Authority

North Lanarkshire Council

Northern Ireland Chamber of Commerce

Northern Ireland Executive – Department for Infrastructure

Northern Ireland Executive – Department for the Economy

Northern Powerhouse Partnership

Orkney Council

Perth and Kinross Council

Public Health Scotland

Rail Delivery Group

Rail Freight Group

Road Haulage Association

Scotland Chamber of Commerce

ScotRail

Scottish Borders Council

Shetland Islands Council

Shetland's Transport Partnership

Society of Maritime Industries

South East Wales Transport Commission

Stagecoach

StenaLine

Tayside and Central Scotland Transport Partnership

Torfaen Council

Transport across the North All-Party Parliamentary Group

Transport for Wales

UK Chamber of Shipping

UK Major Ports Group

UK2070 Commission

Vale of Glamorgan Council

Welsh Government – Economic Infrastructure Directorate

Welsh Infrastructure Commission

Welsh Local Government Association

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