

Central Trans-Pennine Corridor East – West Connectivity

An Economic Study

ON BEHALF OF THE LANCASHIRE ENTERPRISE PARTNERSHIP

IN CONJUNCTION WITH THE WEST YORKSHIRE COMBINED

AUTHORITY AND THE YORK NORTH YORKSHIRE & EAST RIDING LEP

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FINAL REPORT



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1.0 Executive Summary

Introduction and overview

1.1 Cushman & Wakefield (C&W) and SYSTRA have been commissioned by the Lancashire Enterprise Partnership, together with the West Yorkshire Combined Authority (WYCA) and the York, North Yorkshire and East Riding LEP to explore the potential economic benefits that might arise across the North of England from enhanced connectivity between Lancashire and North and West Yorkshire. The purpose of this is to develop a strategic economic narrative to support the case for potential investment and intervention in road/rail based connectivity across these three functional and connected economies comprising the Central Trans-Pennine Corridor. The study focus has been on a wider economic impact case to understand the likely impacts of enhanced connectivity on the “real” economy and an evidence based quantitative and qualitative assessment to support the economic case for improved connectivity has been set out.

1.2 In summary, this report identifies that:

- **The “Central Trans-Pennine Corridor” is already a major economic driver of the Northern Powerhouse and UK economies** - the three LEP areas together have a combined annual GVA output of around £100bn, representing around 7% of national GVA output and one third of the Northern Powerhouse economy GVA output¹. They comprise around 8.5% of the national population² and are home to over 210,000 businesses. The defined ‘Corridor’ for the purposes of this study (see paragraph 2.8) is estimated to have an annual GVA output of around £70bn³, representing around 22% of the overall Northern Powerhouse economy GVA output and circa 5% of national GVA output. It is therefore evident that this is already a Corridor of national economic significance and value.
- **The Corridor is home to globally significant businesses, supply chains and economic assets** – it is home to the largest aerospace cluster in the UK (BAE Systems, Rolls Royce etc), with major sector representation and internationally competitive advantages in sectors such as automotive and other advanced manufacturing, digital, health/life sciences and low carbon/energy. These fully align with the Northern Powerhouse’s ‘Prime Capabilities’ as per the Northern Powerhouse Independent Economic Review (IER). It comprises a portfolio of economic assets and drivers that no other region in the UK can offer, including 14 nationally designated Enterprise Zone sites within or adjacent to the Corridor. It is home to world class businesses and industry clusters in key national priority sectors, world leading research-intensive Russell Group/N8 Group universities, growing and dynamic European cities and a quality of life and visitor economy offer that is second to none. There are wholly complementary sectoral strengths and existing economic activities across the Corridor and opportunities to both enhance the resilience of existing businesses and attract new inward investment in key sectors at all spatial scales.
- **There is significant ambition and ‘untapped’ economic growth potential** – this is a unique and diverse economy with major growth potential offered by its globally recognised economic assets, but which is currently constrained by the lack of east-west connectivity. The three LEP

¹ Based on ONS GVA NUTS 3 data (2015 estimates)

²

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/latest>

³ Based on ONS GVA NUTS 3 data (2015 estimates) where applicable although in some instances (Harrogate/Craven/Calderdale) estimates are based on other local sources (such as the Regional Econometric Model) with assumptions applied as necessary as ONS data is not readily available at this spatial scale

areas have ambitions to together deliver over circa 100,000 new jobs and over 100,000 homes within the next ten years. Improving connectivity would accelerate employment and housing delivery, increase the scale of the overall growth opportunity (jobs, homes and GVA) and improve additionality prospects. Economic output and productivity on a per head basis across the LEP areas is reported to be below the national average and there is a need to continue to seek to narrow this gap through productivity and output growth.

- **Investment in East-West physical connectivity could assist to deliver the IER's transformational economic growth scenario** – according to the IER, this is based on substantial improvements in the skills base, in innovation performance, and in transport connectivity, with GVA projected to be some 15% higher than a 'business as usual' projection. There has been an acknowledged lack of investment in strategic transport infrastructure in the Corridor and this is constraining its economic potential. There is no East-West Strategic Road Network link and the recent focus has been on HS2/NPR in the Core Cities and the M62 Corridor to the South. Without intervention, the Corridor will not reach its potential to deliver against TfN's transformational growth scenario as set out within the IER. There is an identified need to invest in both road and rail infrastructure at strategic and local levels.

Improved connectivity could be highly likely to increase the size and quality of the labour market through enhanced accessibility; increase the efficiency of supply chains; increase the size of the customer base; promote increased Research & Development (R&D) activity and the commercialisation of intellectual property; reduce transport and overall costs of production; and increase overall business productivity through increased agglomeration. The travel to work analysis points to geographically proximate but economically detached/self-contained labour markets which is constraining the Corridor's economic potential. Economic benefits will be realised through better connecting economies and businesses/people within them – the evidence base for this is widely acknowledged. There are also distinct mismatches between areas of distinct socio-economic need (e.g. in parts of East Lancashire) and areas of economic opportunity (e.g. Enterprise Zone sites/key urban areas) which enhanced physical connectivity could address.

- **Enhancing the Corridor's economic potential fully aligns with Government policy** - this is an identified Corridor of unique opportunity with significant latent growth and output potential. Enhancing East West connectivity is a recognised key priority for all three LEPs as defined within the existing policy and strategy base and their respective SEPs, the Northern Powerhouse Strategy, TfN strategy and the Government's emerging Industrial Strategy and recent Housing White Paper. Addressing the existing East-West connectivity constraints will enable the Northern Powerhouse economy to achieve its growth ambitions in accordance with national Government agendas. Whilst this analysis has sought to capture *current* economic activity and *real* evidence of East-West inter-relationships where possible, it is imperative that the economic *potential* of the Corridor is acknowledged. It is considered that the current connectivity issues are restricting the realisation of the scale and extent of potential economic opportunities that exist.

1.3 Our analysis has explored both the quantitative and qualitative economic case for enhanced connectivity. Key headline messages are presented below from this analysis.

Qualitative case for enhanced connectivity

1.4 The qualitative case for investment in enhanced east-west connectivity is based around the following seven key potential benefits:

1. Supporting complementary high growth, high value economic sectors and clusters

Across the Central Corridor and the three functional LEP areas more generally, there are a number of key complementary economic sectors which are considered to be either existing or likely future significant drivers of economic output and productivity. Enhancing the potential for the increased agglomeration of business activity within and between these key existing and growth sectors through improved physical connectivity will undoubtedly offer the potential for enhanced overall economic output across the Central Corridor as well as promote increased innovation, supply chain development, knowledge transfer and overall operational efficiencies. The evidence base to support this relationship between improved physical connectivity and business agglomeration is widely accepted. The economic sectors where we consider there to be key current commonalities/complementarities and significant opportunities for growth across the Corridor based on current economic assets and activity and growth opportunities include the following, which include all four of the IER's identified 'Prime' capabilities:

- Advanced/High Value Manufacturing and Engineering (particularly aerospace, automotive and advanced/technical textiles)
- Health/Med-tech/Life Sciences
- Digital
- Low carbon/energy
- Logistics/distribution
- Food and drink

2. Unlocking the skills, R&D and innovation potential of Corridor economy

The Corridor is home to 9 Higher Education Institutions (HEIs) including a number which are ranked globally as leading institutions in particular taught and research areas. The Universities of York and Leeds form part of the 24 research-intensive, world-class universities that make up the Russell Group and the N8 Research Group includes these as well as Lancaster University. Through the recent Science and Innovation Audit (SIA) and the proposals for a Northern Powerhouse Advanced Manufacturing Corridor, there are plans to further enhance collaborations between the Lancashire and the Sheffield City Region economies including the planned new Advanced Manufacturing Research Centre (AMRC) on the Samlesbury Enterprise Zone site, linked to the existing highly successful operation in Rotherham. Improved Corridor connectivity could deliver increased opportunities for collaboration not only between the universities but also increased opportunities for University-business collaboration and for the Universities to work more closely with the FE sector, particularly in areas where there is no physical HEI presence, a key issue for a large part of the area. Enhanced connectivity could therefore also increase the attractiveness and accessibility of higher level skills development to learners which may have otherwise not been willing/able to consider skills development opportunities and also assist to enhance rates of graduate retention through improving access to employment opportunities, again a key issue for many areas. The Corridor's existing FE/HE offer has a strong focus on key IER and identified growth sectors including advanced manufacturing and Science, Technology, Engineering and Mathematics (STEM) based curriculums and this is evidenced through recent

and proposed initiatives for example in Lancashire such as the Blackpool Energy HQ facility on the Blackpool Airport Enterprise Zone.

3. Supporting the growth potential of other key transport hubs

Enhanced road and rail connectivity could deliver significant benefits to other modes of transport and established transport hubs within the Corridor and the wider North of England, including the following:

- Leeds Bradford International Airport (LBA) – a rapidly expanding airport with plans to double passenger numbers to 7m per annum by 2030 and to explore freight opportunities.
- Manchester Airport – a nationally significant airport with the designated Airport City Enterprise Zone seeking to promote a global business destination including a MediPark focused on the life science sector opportunity.
- Leeds, Preston and York Rail Stations – all existing major rail hub stations with proposals for major expansion and connectivity enhancement at Leeds and Preston as proposed HS2 station hubs.
- Port of Heysham and other East/West coast ports outside of the Corridor (e.g. Liverpool, Hull, Immingham, Teesport).

4. Supporting the needs and expansion of existing major employers and their supply chains

The Corridor is home to a number of major, globally important businesses and employers, responsible for significant levels of employment and economic output. These are critical to the Northern economy, not only due to their direct employment and economic output but the wider supply chains that they create and support. It is also home to a number of major supply chains in key sectors which are key to the future economic growth of the Northern economy and increased mobility and connectivity across the North will be a key driver of the success of these supply chains and wider economic growth prospects.

With the uncertainty of what Brexit could mean for these businesses and wider global competition within the industry (particularly from lower cost base locations), there is a need to ensure that the local and regional physical infrastructure that these businesses require to meet their operational needs is adequate, otherwise this could be another push factor in favour of relocations to other locations globally. With increasing globalisation and overseas competition across a number of sectors, businesses are under significant pressure to enhance the efficiency of their supply chain operations. With an increasing focus on 'just in time' manufacturing strategy, ensuring supply chain efficiency is key. Supporting the needs of businesses and their supply chains to safeguard existing activity as well as supporting future investment/expansion activity is therefore critical particularly given the scale of operations in sectors such as aerospace and automotive and others in this Corridor. The Lancashire SEP identifies that the failure to deliver the transport infrastructure needed to support sustained business success, accounts for one-quarter of Lancashire's current economic performance gap with the rest of the UK.

5. Attracting new high value business activity and inward investment to the Corridor and wider Northern Region

There is also a case for investment to enhance east-west connectivity from the perspective of attracting new businesses and inward investment to the Corridor and the wider Northern region to strengthen existing clusters in key sectors. The quality and provision of transport infrastructure is likely to be a key factor accounted for by inward investors when assessing the merits of location

options as this can impact upon both labour supply and supply chain operations as well as the accessibility of the location to other company locations across the UK and internationally.

Place marketing and the promotion of wider quality of life is also an integral component of securing inward investment and transport connectivity is key to ensuring that people can live in attractive areas and commute to their workplaces efficiently and effectively on modern and reliable transport networks. Promoting accessibility to high quality cultural, leisure and visitor economy assets will also be important as part of this. For example, the Corridor links together a number of designated national parks, areas of outstanding natural beauty (e.g. the Forest of Bowland and Nidderdale) and coastlines with a number of highly popular coastal resorts such as Blackpool, Scarborough and Whitby which are key economic drivers in their own right. Ensuring that people can access these assets efficiently via road/rail will enhance the attractiveness of the Corridor and assist to drive levels of visits and associated net additional expenditure from both residents within the Corridor and those further afield.

6. Supporting housing and employment growth proposals and requirements

The Central Trans-Pennine Corridor as a whole is likely to experience significant population growth over the medium term in line with wider UK projections and local authorities are planning for this through allocating land for development in conjunction with key national drivers such as the Government's recent Housing and Planning Act (2016) and Housing White Paper (2017) and proposed Government interventions to drive housing supply. It is not only important that there are sufficient new homes and jobs to meet the needs of a growing population, but also that people can physically access employment opportunities. The delivery of transport infrastructure can also directly unlock housing and employment land for development through serving as critical enabling infrastructure.

It is essential that existing and proposed employment sites are supported with the necessary transport infrastructure to maximise their potential. It has already been identified that a number of businesses in the Corridor rely on east west movements as part of their business operations and with such significant growth planned, the emphasis on east west movement is only likely to increase.

It is also recognised that many of the proposed strategic housing and employment sites are located on the either side of the Corridor (i.e. around Leeds/Bradford/York/Harrogate and Preston/Lancaster). This is particularly evident with the locations of the 14 nationally important Enterprise Zone sites – these are all located on the fringes of the Corridor. This is reflective of the larger urban settlements on the fringes of the Corridor and the stronger North-South links in these areas. It is therefore critical that East-West connectivity is enhanced to enable people to access suitable and available employment opportunities, particularly from identified areas of socio-economic need which are concentrated in the heart of the Corridor (see below).

7. Addressing socio-economic inequalities

Parts of East Lancashire (e.g. Burnley, Pendle, Blackburn) and West Yorkshire (e.g. Bradford) represent some of the most deprived communities nationally, based on the 2015 Index of Multiple Deprivation (IMD). Enhanced East-West connectivity (in terms of journey times, cost and resilience) across the Corridor would assist to address the identified socio-economic inequalities and disparities and to enable people to access economic opportunities across the geography of the Corridor. It would enable increased cross boundary/cross county flows and movements and would provide increased opportunities to better connect people to employment and skills/learning and maximise the potential of the Corridor's economic asset and business base. There is no doubt

that the current physical connectivity issues on an East-West basis are restricting the horizons of people, particularly from a travel to work and business to business perspective. Given the relatively small point to point distances between key locations within the Corridor, the transport connectivity issue should not be as significant as it appears to be and needs to be addressed if the economic potential of the Corridor and wider Northern Powerhouse economy is to be fully realised and the productivity gap with the rest of the UK closed.

Quantitative case for enhanced connectivity

- 1.5 In addition to the above qualitative benefits of enhanced East West connectivity, a quantitative assessment, based on a bespoke wider economic impacts model was developed in accordance with the Department for Transport's (DfT) WebTAG.
- 1.6 The modelling work examines two key areas of potential benefit:
- Firstly "agglomeration" benefits – the benefits of businesses being located closer together and the associated increases in productivity that arise from this; and,
 - Secondly the "employment" effects, which look at the benefits to the labour market of improvements in connectivity where employers and employees can be better matched increasing productivity and better matching skills. In turn this brings additional employees into the system who may not previously have been in work.
- 1.7 To provide an understanding of the potential wider economic impacts of future strategic transport investment across the area, nine "tests" have been conducted covering a range of scenarios reflecting improvements to road and rail, both separately and in combination across the defined study area. The tests also include consideration of the impacts of different scales of intervention. The tests avoid identifying and testing specific schemes. Instead the modelling has focused on what the overall output would be, in terms of generalised cost or journey time reduction. The outcomes of these scenario tests in terms of annual Gross Domestic Product (GDP) benefits are presented below in Figure 1.1:

Figure 1.1. Agglomeration and Employment Model £m GDP per annum

	Description	Agglomeration Model	Employment Model	Total	Rank
Test 1	10% GC Reduction	£30.16	£4.42	£34.58	3
Test 2	20% GC Reduction	£61.52	£9.77	£71.30	1
Test 3	10% GC Reduction (Highways)	£18.77	£3.62	£22.4	5
Test 4	20% GC Reduction (Highways)	£30.32	£8.30	£36.63	2
Test 5	Average to Minimum JT	£15.70	£2.08	£17.79	6
Test 6	Maximum to Average JT	£6.98	£2.09	£9.08	9
Test 7	10 minute Cross Pennine Reduction	£10.92	£0.90	£11.82	8
Test 8	20 minute Cross Pennine reduction	£11.25	£1.01	£12.26	7
Test 9	25% Rail GC Reduction	£30.75	£1.74	£32.49	4

- 1.8 The following key conclusions can be drawn from this:

- There is likely to be a significant level of net additional economic benefit from wider economic impacts attributable to enhanced East-West transport connectivity across the corridor;
- Investment in both road and rail will be beneficial considering the wider economic impacts identified. Indeed, the difference between the modelled outputs from tests 1 & 2 (generalised cost reduction on both road and rail) and tests 3 & 4 (highways only) suggests that the scale of benefit from a reduction of generalised cost on rail is in the same order to that from road. The results of test 9 confirm that potentially significant benefits may accrue from investment in rail. In terms of distribution, investment in highways spreads the benefits across the study area, while rail provides significant benefits at key 'nodes' (those larger town and city centres with a rail service);
- This distribution is intuitive given the nature of the road and rail networks, but the fact that the scale of benefits from rail is similar to that from road is noteworthy, as the rail network is relatively limited in the corridor, suggesting there is 'more bang' in terms of wider economic impacts from a limited number of opportunities to improve rail travel. This is perhaps reflective of the very poor quality of rail services in East Lancashire at present, which presents a large opportunity for transformational change. One caveat on the difference between road and rail is that some benefits may have been lost, potentially significant in scale, as no account of entirely 'external' trips (starting and finishing outside the modelled area, for example, Blackpool to Scarborough) is taken within the modelling work. It is likely that this will affect the road element more than rail, as there are potentially significant numbers of long distance road trips in the corridor;
- There is little additional marginal economic benefit of increasing cross Pennine journey time savings from 10 minutes to 20 minutes. This is a function of the fact that in practical terms, reducing journey times by 20 minutes results in unrealistic average speeds for many road trips (i.e. in excess of legal limits). This also suggests that the main benefits are gained from shorter trips in the immediate cross-boundary area of the corridor.
- The reliability tests (tests 5 & 6) generate a relatively lower level of wider economic benefits than others, suggesting that many of the trips that are affected by poor reliability are relatively short trips. These results suggest that the main reliability benefits may be localised, not from 'end-to-end' or longer journeys. It may therefore be that investments in critical 'pinch point' resilience issues in the network may be the answer to this issue;
- This point regarding local issues is reinforced by the finding that there are diminishing returns on highways improvements - a 20% generalised cost reduction doesn't double the wider economic benefits gained by a 10% generalised cost reduction on highways.

Summary

- 1.9 Overall, there is considered to be a robust and compelling quantitative and qualitative economic case for enhanced East-West Connectivity across the Central Corridor. Improved connectivity would not only address the economic challenges and ambitions of the Corridor itself but it could also enhance the wider economic prosperity of the North as a whole and enable the Corridor to provide a complementary route to the M62 corridor to provide additional resilience to Trans-Pennine connectivity more generally, a key pan-Northern objective in terms of road and rail, passenger and freight movements. A failure to improve East-West connectivity and address current connectivity constraints would be likely to critically restrict the growth potential of the Corridor economy, as a key driver of the wider Northern Powerhouse economy.
- 1.10 The analysis has demonstrated that there will naturally be significant economic benefits of investing

in both road and rail infrastructure and both modes are important to meeting current and future economic needs. An optimum investment strategy would require a comprehensive approach to developing and delivering a phased multi-modal investment programme to address both strategic transport connectivity and critical 'pinch point' resilience issues.

- 1.11 There is a limited rail network across the Corridor, particularly in East Lancashire and the provision of an enhanced rail network would need to be aligned with local demographic and business/economic need and growth opportunities. Rail flows are typically targeted at major settlements where there are more likely to be high value jobs, for example in the producer services and consumer services sectors, and rail networks can also significantly enhance accessibility to urban centres to improve the mobility of labour supply. The case for transport investment within the Corridor needs to relate to the current and future economic drivers of the Corridor and these are varied, although appear to focus significantly on advanced and innovative manufacturing based activity, which is likely to continue to be dependent upon an efficient road transport network, along with other key sectors such as logistics, food and drink and energy. However, other professional service based growth sectors such as digital and health/life sciences may be more reliant upon enhanced rail services to enhance their output and growth prospects, particularly through enhanced agglomeration and access to skilled labour.

2.0 Introduction

Purpose of this report and background

- 2.1 Cushman & Wakefield (C&W) and SYSTRA have been commissioned by the Lancashire Enterprise Partnership together with the West Yorkshire Combined Authority (WYCA) and the York, North Yorkshire and East Riding LEP to explore the potential economic benefits that might arise across the North of England from enhanced connectivity between Lancashire and North and West Yorkshire. The purpose of this is to develop a strategic economic narrative to provide an evidence base to support the case for potential investment and intervention in road/rail based connectivity across these three functional economic geographies.
- 2.2 This report focuses on a 'Central' Trans-Pennine Corridor and includes key road routes such as the M65/A59/A65 and rail routes such as the Calder Valley line. There have been longstanding ambitions from both sides of the Pennines to enhance connectivity in this Central Corridor and a number of more local schemes have been considered and some delivered. However, none of the road routes within the Corridor form part of the national Strategic Road Network (SRN) and much of the Transport for the North (TfN) work to date on the Northern Transport Strategy has focused on the SRN and the proposals to enhance the rail connectivity of northern cities through initiatives such as Northern Powerhouse Rail (NPR) and the proposals for a Trans-Pennine Tunnel between Manchester and Sheffield.
- 2.3 Much of the recent and historic focus of transport investment across the Pennine area is on or around the M62 Corridor, either along the M62 Motorway or the Trans-Pennine Express rail route between Leeds and Manchester. Road and rail links in the Central Corridor have generally tended to follow historic trade routes dictated by topography rather than user demand or economic geographies and are generally considered to be fairly constrained in terms of their alignments, suitability, capacity and reliability. The routes are certainly of an inferior overall quality compared to those along the M62 Corridor between Leeds and Manchester and this report presents an economic evidence base to support potential connectivity enhancements in this Central Corridor.
- 2.4 This report provides a summary of our findings, based on research, key stakeholder consultations and economic modelling work. It is intended to be a 'strategic' advocacy report to inform and influence policy and funding decisions based on existing economic evidence. It is intentionally non-scheme specific and rather presents an economic narrative and justification for enhanced East-West connectivity between Lancashire and North/West Yorkshire across the 'Central' Corridor to support potential future transport infrastructure based interventions.

Context – the links between transport connectivity and economic growth

- 2.5 The inter-relationships between transport connectivity and economic growth have been well documented over the years and there has for some time been a generally accepted view that strong transport links are critical to supporting economic growth. Research undertaken in 2014, commissioned by the Department for Transport (DfT)⁴, identified that the impacts of a transport improvement are wide-ranging and can be grouped into three types; user benefits, productivity effects, and investment and employment effects. In terms of productivity benefits, it is suggested that transport investment can result in:

⁴ Venables, Laird, Overman, 2014, *Transport investment and economic performance: Implications for project appraisal*, Paper commissioned by UK Department for Transport.

- Improved economic interactions between firms (and between firms and consumers)
 - increased specialisation and sector specific advantages
 - Improved access for workers to concentrated and productive centres of activity.
- 2.6 In recent years there has been an increasing policy and economic focus on transport and connectivity investment as a direct driver of economic growth in its own right. The DfT and HM Treasury have become increasingly interested in the wider economic benefits associated with transport-based investment, particularly in terms of agglomeration benefits (i.e. the quantification of economic value associated with the geographical/spatial concentrations of businesses and people through enhanced connectivity). Developing a successful case for public sector investment in major strategic transport schemes now needs to be based on far more than the articulation of congestion relief/journey time savings and the wider economic benefits case is key to this.
- 2.7 As identified within the 2006 Eddington Transport Study (commissioned by the Secretary of State for Transport), *“good transport systems support the productivity of urban areas, supporting deep and productive labour markets, and allowing businesses to reap the benefits of agglomeration”*. The report goes on to suggest that *“transport corridors are the arteries of domestic and international trade, boosting the competitiveness of the UK economy”*⁵. This principle is now well accepted and the wider economic benefits of transport investments form an integral component of the case for investment and intervention from a public sector perspective.
- 2.8 There is a substantial evidence base that supports the principle of transport infrastructure as a key driver and component of economic growth, particularly in terms of the “wider economic” agglomeration based benefits that it can deliver. Developing an economic case based upon this and the wider economic development and growth prospects of the economy over and above a journey time/cost saving will therefore be an important of the rationale for investment in this Central Trans-Pennine Corridor. Key to this is an understanding of the economic inter-relationships between the identified functional economic LEP areas and extent to which the current infrastructure may serve as a current or future barrier to economic growth and competitiveness potential.

The study area

- 2.9 It is important to articulate the boundary study area that was used for the purposes of our quantitative modelling although the economic benefits of enhanced connectivity will extend far beyond this across the North of England. The study focuses on East-West connectivity in the ‘Central Trans-Pennine’ Corridor. The client brief described the study area Corridor as follows:
- “This ‘Central’ Trans-Pennine Corridor comprises the M65/A56/A6068, A59 and A683/A687/A65 roads and parallel railways, including the Calder Valley line linking Preston, Blackburn and Burnley with Bradford and Leeds via Hebden Bridge and the line linking Lancaster with Leeds via Skipton”.*
- 2.10 Our modelling was undertaken within this Corridor, focusing on these key east-west routes. We avoided east west movements in adjacent corridors (essentially the M62) or where north-south movements have a significant role in connectivity. This last point essentially means the A1 corridor to the east, and the M6 to the west, but also the M66 to Manchester. We therefore sought to exclude places that were strongly influenced by these neighbouring east-west and north-south corridors. Discussions took place with respect to Selby (A1), Rossendale (M66), Blackpool and significant growth sites in the west of Lancashire (M6), and Huddersfield (M62), all of which were excluded in order not to skew the analysis with the influence of movements that were not essentially about east-

⁵ The Eddington Transport Study, December 2006, Main Report, *Transport’s role in sustaining the UK’s productivity and competitiveness*

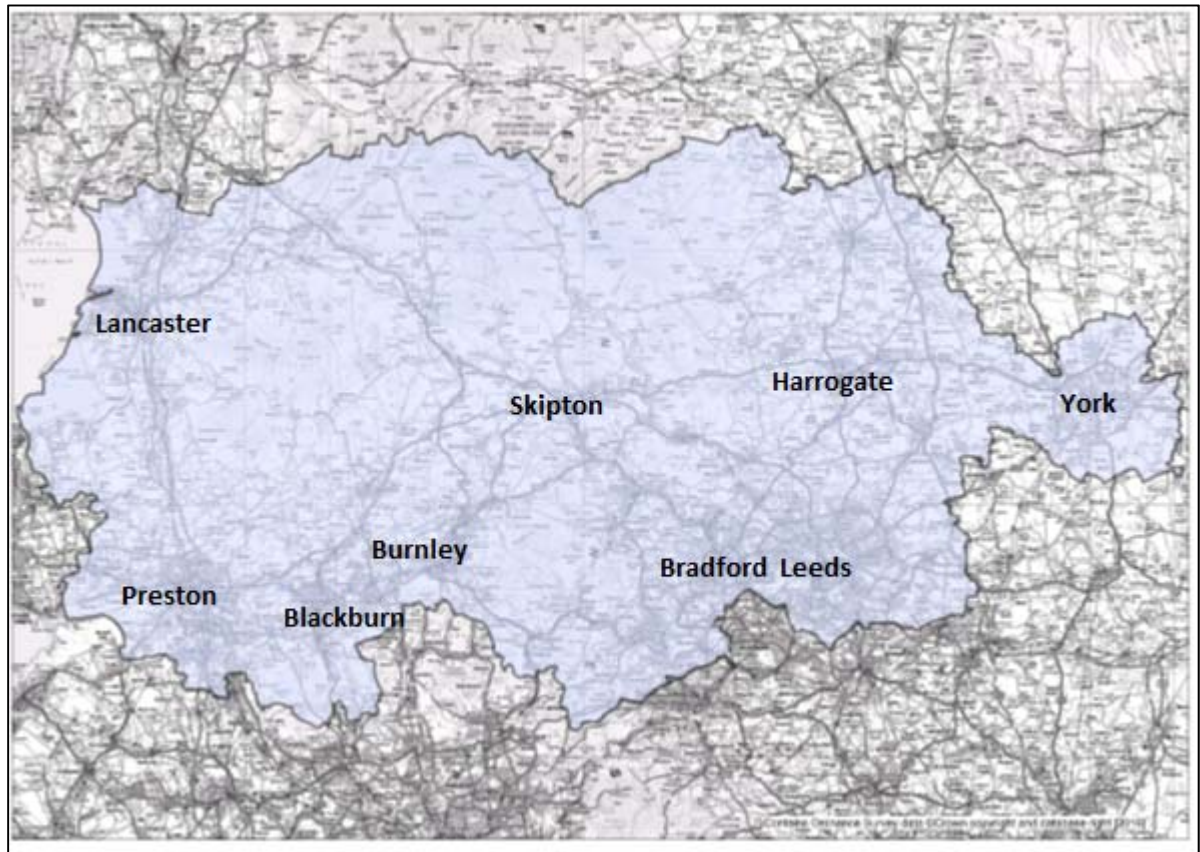
west business travel in the corridor in question.

2.11 For the purposes of this work we have assumed the below for the wider economic quantitative modelling only. This is presented further within Figure 2.1 below:

- Given Huddersfield's location and current transport connectivity, the majority of its east-west movements into the corridor will be likely to be along the M62/TPE rail route to Leeds or Manchester and then up, which is outside of the scope of this study;
- The stretch of the A64 (A1(M) to York), and Selby district more generally, is not considered within scope for this work largely because routing would tend to be via the M62 corridor from a number of places, rather than via the A59-M65 corridor. It is this latter corridor that is the focus for this work.
- Rossendale is excluded from the wider economic modelling as are Kirklees and Wakefield as these are considered to be too far south and fall within the M62 Corridor as per Huddersfield above;
- The unitary authority of Blackpool as well as the western parts of Fylde (west of Poulton-le-Fylde) and Wyre (to the west of the River Wyre Estuary) have been excluded from the wider economic impact modelling. It is important to note that the wider economic impacts modelling undertaken focuses on two very specific aspects of the economy, namely the agglomeration effects (which are derived from improved connectivity on business-to-business journeys) and the employment effects (derived from improvements to connectivity that widen the labour market). The importance of the visitor economy to Blackpool, and the influence of visitor trips as one of the principal sources of journeys to and from Blackpool would not be reflected significantly in either of these 'slices of the economy' which are captured within the modelling. The inclusion of Blackpool could therefore 'skew' the modelling outputs which do not pick up wider visitor economy based trips as they are focused on business to business movements. The western parts of Fylde and Wyre have also been excluded as they are geographically contiguous with Blackpool and the M55 remains the primary route to these areas from Preston and the wider Corridor to the East. The highway network west of the M6 along the M55 and other routes is relatively unconstrained in comparison to the central M65/A56/A6068, A59 and A683/A687/A65 corridors, and therefore, the requirement for road transport infrastructure investment is likely to be less of a priority. East West based rail connectivity to Blackpool North is via Preston and provides a regular service at present for largely local trips and visitors.

It is important to note that the qualitative economic narrative as part of this study does include the wider LEP areas beyond the immediate boundaries of the wider economic modelling study boundary. This includes narrative, for example on the Enterprise Zone sites at Blackpool Airport and Hillhouse International Enterprise Zone as well as key economic assets and drivers within the LEP areas as a whole such as the coastal resorts of Blackpool, a significant visitor economy asset for Lancashire.

Figure 2.1: Central Trans-Pennine Corridor Area as defined for the purposes of the quantitative economic modelling



Our approach

2.12 Our approach to this commission has included the following key tasks which form the structure and key sections of this report:

- Brief “snapshot” of the 3 functional economic LEP areas that form the basis of the Central Corridor;
- Review of the existing major policy/strategy drivers and evidence base from both economic and transport connectivity perspectives;
- Review of current travel to work flows across the study area;
- Consultations with key stakeholders (see below);
- Overview of key current transport challenges and constraints;
- Qualitative economic narrative for enhanced connectivity;
- Quantitative economic assessment of the case for enhanced connectivity, largely based on agglomeration and labour market impacts of improved connectivity, informed through the development of a bespoke transport economics model using the DfT’s WebTAG approach.

Stakeholder consultees

- 2.13 As part of this commission, we have undertaken an extensive process of stakeholder consultation and engagement. The purpose of this was to seek the views of local and strategic stakeholders to inform the emerging evidence base. We engaged with a range of public and private stakeholders and there was an overwhelming degree of support for the strategic principle of enhancing East-West connectivity from all stakeholders. The key purpose of these was to identify where there was anecdotal evidence available to support the case for enhanced connectivity as part of developing a wider economic narrative. The feedback from these has informed the qualitative economic narrative presented later in this report.
- 2.14 A list of the stakeholders that have been consulted as part of this commission is presented below:

Organisation
LEP/CAs
Lancashire LEP/CC
North Yorkshire LEP/CC
WYCA/Leeds CR LEP
Lancashire Local Authorities
Preston City Council
Burnley Council
Lancaster City Council
Pendle Borough Council
Hyndburn Council
Ribble Valley Borough Council
Blackburn with Darwen
South Ribble Borough Council
West and North Yorkshire Local Authorities
Craven District Council
Harrogate Borough Council
Leeds City Council
Selby District Council
York City Council
Bradford Metropolitan District Council
Wakefield Metropolitan District Council
Calderdale Metropolitan Borough Council
Kirklees Metropolitan Borough Council
Private Sector/Other
North West Aerospace Alliance
Northern Automotive Alliance
East Lancashire Chamber of Commerce
West and North Chamber of Commerce
SELRAP
Lancaster University
NW Texnet
Leeds Bradford International Airport
Drax Group plc
Wincanton plc

3.0 'Snapshot' of the 'Central Corridor' functional economic areas

Introduction and overview

- 3.1 This section presents a brief 'snapshot' overview of each of the three functional economic LEP areas within the defined 'Central Corridor' study area. The purpose of this is to provide background economic context to the later sections of the report and this section is informed largely by the three respective Strategic Economic Plans (SEPs) and their evidence base for each of the three areas.

Overview

- The 3 LEP areas together have a combined annual GVA output of around £100bn, representing around 7% of national GVA output and one third of the Northern Powerhouse economy's GVA output⁶. They comprise around 8.5% of the national population⁷ and are home to over 210,000 businesses.
- The defined 'Corridor' for the purposes of this study is estimated to have an annual GVA output of around £70bn⁸, representing around 22% of the overall Northern Powerhouse economy's GVA output and circa 5% of national GVA output. It is therefore evident that this is a Corridor of national economic significance and value.

It is clear from the above that there are a number of similar and complementary economic opportunities and challenges facing each of these functional economic areas, including the following:

- Economic output and productivity on a per head basis across all 3 LEP areas is reported to be below the national average and whilst GVA per head output has been increasing there is a need for a focus on driving productivity to narrow this gap with the national average.
- There are a number of identified high growth and important economic sectors which are consistent across the 3 functional economies, for example, advanced manufacturing, food manufacturing, health and energy. It is evident that there are a number of complementary sector strengths and this is considered to be a key driver for the need for enhanced connectivity.
- There are gaps/'mismatches' between the supply and demand for skills, particularly in relation to the sectors of the economies which are identified as having the greatest growth potential as above.
- There is a recognised need to drive innovation and R&D to maximise business growth and productivity.
- There is a need to drive additional high wage, high value employment opportunities and to attract inward investment, levels of which are reported to be comparatively 'low'.
- There are pockets of severe socio-economic deprivation in all 3 areas which need to be addressed.
- Each of the SEPs places a significant emphasis on the need to invest in economic infrastructure, particularly transport infrastructure, to achieve their economic ambitions. East-West connectivity is specifically identified as a critical challenge and this is explored further in Section 6 of this report.

⁶ Based on ONS GVA NUTS 3 data (2015 estimates)

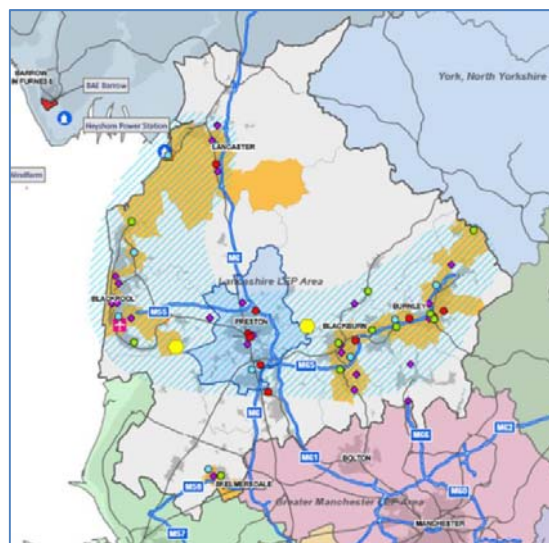
⁷

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/latest>

⁸ Based on ONS GVA NUTS 3 data (2015 estimates) where applicable although in some instances (Harrogate/Craven/Calderdale) estimates are based on other local data sources (such as the Regional Econometric Model) with assumptions applied as necessary, as ONS data is not readily available at this spatial scale

Lancashire LEP economy

3.2 The functional LEP area of Lancashire covers the Lancashire County Council spatial area which includes 12 districts and the 2 unitary authorities of Blackpool and Blackburn with Darwen. These are illustrated in the plan in Figure 3.1 opposite. It is a large and diverse area with Lancaster as its County Town, although Preston as its administrative centre and key urban centre. Lancashire emerged as a major industrial area during the Industrial Revolution when it was a global centre for cotton processing, largely focused around the textile mill towns to the east of the County. Manufacturing remains the predominant economic sector although the focus of this has shifted towards key advanced manufacturing growth sectors such as the aerospace and automotive sectors.

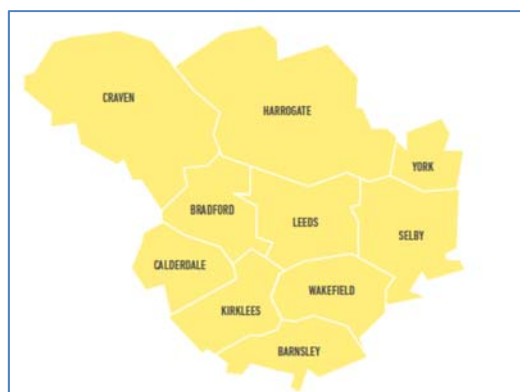


- 3.3 The Lancashire SEP identifies that the annual GVA output of the LEP economy is currently valued at over £23 billion and that it is home to over 40,000 businesses employing in excess of 600,000 people, with a population of 1.4m. The SEP recognises that although Lancashire has economic 'hotspots' such as the cities of Preston and Lancaster, the economy's average performance still consistently lags behind that of the UK and neighbouring city regions. It is suggested that between 2007 and 2011, Lancashire's economy grew by 4.4% compared to 6.5% nationally and 4.9% regionally; with Lancashire's GVA per capita being 77% of the UK average⁹. The SEP reports that the economic performance of Lancashire is more than 20% below the national average, in terms of GVA per resident. Narrowing this GVA gap with the rest of the country is a key ambition and the SEP suggests that *"if Lancashire is to maximise its economic potential it will need to fully exploit its key innovation, skills, sector base and transport assets"*.
- 3.4 There are a number of identified skills issues within the economy, particularly relating to a mismatch between the selected pathways of local people and the sectors of the economy which have the greatest growth potential and there are also identified pockets of very low skills levels in corresponding areas of social and economic deprivation. It is clear that these skills issues need to be addressed, particularly in light of the priority growth sectors below and the skills implications of realising this growth. Despite this, the SEP recognises that in addition to a number of leading Universities, Lancashire is the only LEP area in the country where all FE colleges and locally-based training providers are recognised as good or outstanding.
- 3.5 The SEP identifies 3 key priority sectors for growth in Lancashire: Aerospace, Automotive and Energy. It also identifies a number of 'developing sectors', including: Health, Aerospace – unmanned aerial vehicles, Digital and Business Process Outsourcing as well as existing key employment sectors including: food manufacturing, the visitor economy and business and financial services. It is suggested that the economy has the potential to develop and grow a number of clusters of international importance in these sectors, particularly aerospace and automotive where it has a longstanding leading European and global role in these industries. The SEP identifies that these sectors have the potential to deliver a scale of growth which will have a transformative impact on the local economy and are primarily focussed within the Advanced Engineering and Manufacturing (AEM) sector.

⁹ Economic Forecasts for Lancashire, Oxford Economics, 2013

Leeds City Region (LCR) LEP economy

3.6 The Leeds City Region economy covers a large and diverse geographical area that includes 10 local authority areas largely across West Yorkshire, but also includes parts of North and South Yorkshire, as illustrated in figure 3.2 opposite. Leeds is the largest city in terms of geographical area, economy and population. The City Region comprises a distinctive and polycentric mix of urban and rural areas in close proximity, with the north more rural (albeit with large centres such as York and Harrogate) and the south more urban with a number of former industrial centres).

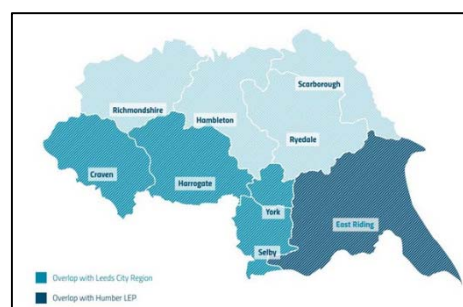


- 3.7 The LCR is reported to be the largest city region economy outside of London and generates £62.5bn of output per annum, representing around 5% of total UK output. The SEP reports that City Region productivity is similar to most core city LEAs in the North and Midlands (at £27 per hour in 2014), but stands at just under 90% of England average. It is reported to be rising, but more slowly than average, so the gap against the rest of the UK is widening. The 2016 LCR Economic Assessment identifies that if LCR Gross Value Added (GVA) per person matched the English average, the LCR economy would be £13.8 billion larger. The SEP also identifies that the rate of economic growth is below that of England. The LCR economy grew by 73% between 2000 and 2014, compared to growth of 77% in England. It has a population of 3 million and a working age population of 1.9m and is home to around 119,000 businesses.
- 3.8 It is well known that the City Region, largely but not exclusively driven by Leeds, is the largest centre for finance and professional services outside of London. The SEP suggests that it is also the UK's largest manufacturing centre with 142,000 jobs – a number which is increasing locally, despite national decline. It is specific strengths on an international scale in polymers, turbo technologies and advanced textiles, for example. It is also widely reported that the LCR has more Higher Education Institutions than any UK economy outside of London with 9 universities, in addition to its 14 FE colleges. The SEP identifies that skills levels have continued to improve across the City Region, and are comparable to most core city region LEP areas. However, it is suggested that they have not improved quickly enough to close gaps to the national average and the shortfall in qualification levels has widened. There are also reported gaps in employability and skills and mismatches between the supply and demand for skills at sector level, including skills shortages in areas such as engineering, construction and software/coding. This is linked to the identified concern for the LCR that far fewer high income jobs have been created in relative terms than in other parts of the country with growing income inequalities as a result. The City Region still has much more than its 'fair share' of poverty and deprivation with the SEP reporting that 17% of local areas in the Leeds City Region are in the most deprived 10% in England, two-thirds higher than the national average.
- 3.9 The SEP suggests that the LCR needs more innovation, investment and exports; a stronger national and international profile; and to see more high growth companies and successful business starts. It identifies that workforce skills are below average and there are areas with high levels of deprivation. The focus is on driving 'good growth' to drive productivity and output to become an above average net contributor to the UK economy in terms of tax revenues.
- 3.10 The SEP identifies the following 6 key priority sectors for growth where it has identified particular clusters of strength and opportunity:

- Digital and Creative
- Low carbon and environmental industries
- Health and life sciences
- Innovative manufacturing
- Financial and professional services
- Food & drink

York, North Yorkshire and East Riding LEP economy

3.11 As the title suggests, the York, North Yorkshire and East Riding LEP area covers the breadth of the County of North Yorkshire as well as the East Riding of Yorkshire District, including nine districts in total, as per figure 3.3 opposite. The LEP area includes a significant breadth of urban, rural coastal areas and is suggested to be largest LEP area nationally by area. It is characterised by a diverse range of physical and economic landscapes from the heritage City of York and the spa town of Harrogate, both key economic drivers in their own right, through to rural and coastal hinterlands including key tourism locations such as Scarborough and Whitby on the East Coast. Quality of life is a key component of the LEP area's offer and it is home to two National Parks.



- 3.12 The LEP economy generates £24bn of annual output and it comprises over 51,000 businesses¹⁰. Its population is 1.14 million, with a higher than average percentage of those aged over 65 (22.7% compared with 17.8% nationally). LEP GVA per head is lower than national levels and narrowing the gap between the area's productivity and the national average is a key LEP objective¹¹.
- 3.13 In 5 of its 9 districts, manufacturing or accommodation/food services is the sector with the most employment, whilst agriculture remains a key source of employment (3.7 times more people employed in agriculture than the national average) (based on LEP Economic Review 2015/16). This is acknowledged within the SEP as creating wage/income challenges given the high reliance upon the tourism sector. Reflecting its natural resource base and location, the LEP area is also home to a number of unique assets and business activity such as the largest offshore wind farm proposals in the world at Dogger Bank and the proposed £1.7bn potash mine investment. The SEP identifies that its biggest distinctive strength compared with other areas are its assets around agri-food and biorenewables and bioscience. These are recognised as key UK growth sectors, with the potential to lead on an international scale.
- 3.14 The SEP reports a strong business base with above average business survival rates. 89% of businesses have less than 10 employees which is higher than national averages and the number of businesses is growing, but at a slower rate than nationally due to lower start-up rates. It has lower than average wage and productivity rates and its ageing workforce is reported as a critical issue, with 27% of its current workforce due to retire by 2022. The LEP recognises that there is a vital need to attract and retain talent but this can be challenging with the lack of available and affordable housing supply.
- 3.15 The LEP Economic Review identifies that levels of R&D/innovation are low overall (despite the existence of a significant number of highly innovative businesses and activities). It suggests that the proportion of businesses introducing new or improved products and services is the lowest of all 39

¹⁰ <http://www.businessinspiredgrowth.com/where-we-cover/>

¹¹ York, North Yorkshire and East Riding Economic Review 2015/16 (Draft)

LEPs at 12% and that this lack of innovation needs to be addressed. However, it is also recognised that the LEP area is characterised by a strong education system and high levels of skill attainment (39.6% with NVQ4+ compared with 35.8% nationally) and a low unemployment rate. There are, however pockets of deprivation, high unemployment and low skills in some coastal and urban locations.

- 3.16 Going forward, a number of LEP priority growth sectors are identified including advanced manufacturing, energy, bioeconomy, knowledge based industries and others such construction, health and social care and the visitor economy.

4.0 Strategic economic and transport policy context

Introduction and overview

- 4.1 This section provides an overview of the existing major policy and strategy drivers for enhanced East West connectivity across the Central Corridor. It draws upon a number of published economic and transport policy/strategy documents to inform this. Understanding current policy objectives is important as any emerging case for enhanced connectivity needs to build upon and support existing economic and transport policy and strategy if it is to have maximum impact. This section is split into two parts with the first providing an overview of relevant economic policy/strategy and the second focusing more on the existing transport policy/strategy evidence base.
- 4.2 It is evident from the economic and transport policy context that economic growth across key IER sectors is a key priority for all three LEP areas and that all have set ambitious employment and housing delivery targets over the short-medium term. The need for enhanced transport connectivity and infrastructure provision that supports economic growth objectives is identified across the various SEPs as being critical and the evidence base points towards decades of underinvestment that is now holding back growth ambitions. The need to enhance connectivity both within and between functional economic areas is identified across road and rail modes and East-West connectivity issues are highlighted as a particular constraint to economic growth across the Corridor. The Independent Economic Review (IER) identifies an ambition for a transformational economic future for the North whereby improvements in transport connectivity are considered critical to unlocking the potential. This is reinforced by the Northern Powerhouse Strategy, the recent Science and Innovation Audit (Lancashire/Sheffield City Regions) and the recently published Industrial Strategy Green Paper, which strongly reinforces the need to align infrastructure investment with local growth priorities.

Relevant Economic Policy/Strategy Context

Strategic Economic Plans (SEPs)

- 4.3 This section focuses on the ambitions and aims of the relevant SEPs for the Corridor economy to understand the growth objectives of the Central Corridor area. The 3 SEPs together identify ambitions to deliver over 100,000 new jobs and 100,000 new homes over the next 10 years (broad figures as each has different targets and timescales for achievement). It is widely accepted that transport infrastructure is a requirement as well as an enabler and catalyst for economic growth. It is therefore important to understand the scale and type of growth proposed to inform the extent to which transport infrastructure could unlock/enable/enhance the delivery of this in accordance with wider SEP ambitions. This section also draws out specific references within the Economic Plans to the need for investment in transport infrastructure and connectivity, particularly to improve East-West movement accessibility and reliability. Further SEP analysis is included within the narrative to support the case for enhanced connectivity in Section 6 of this report.

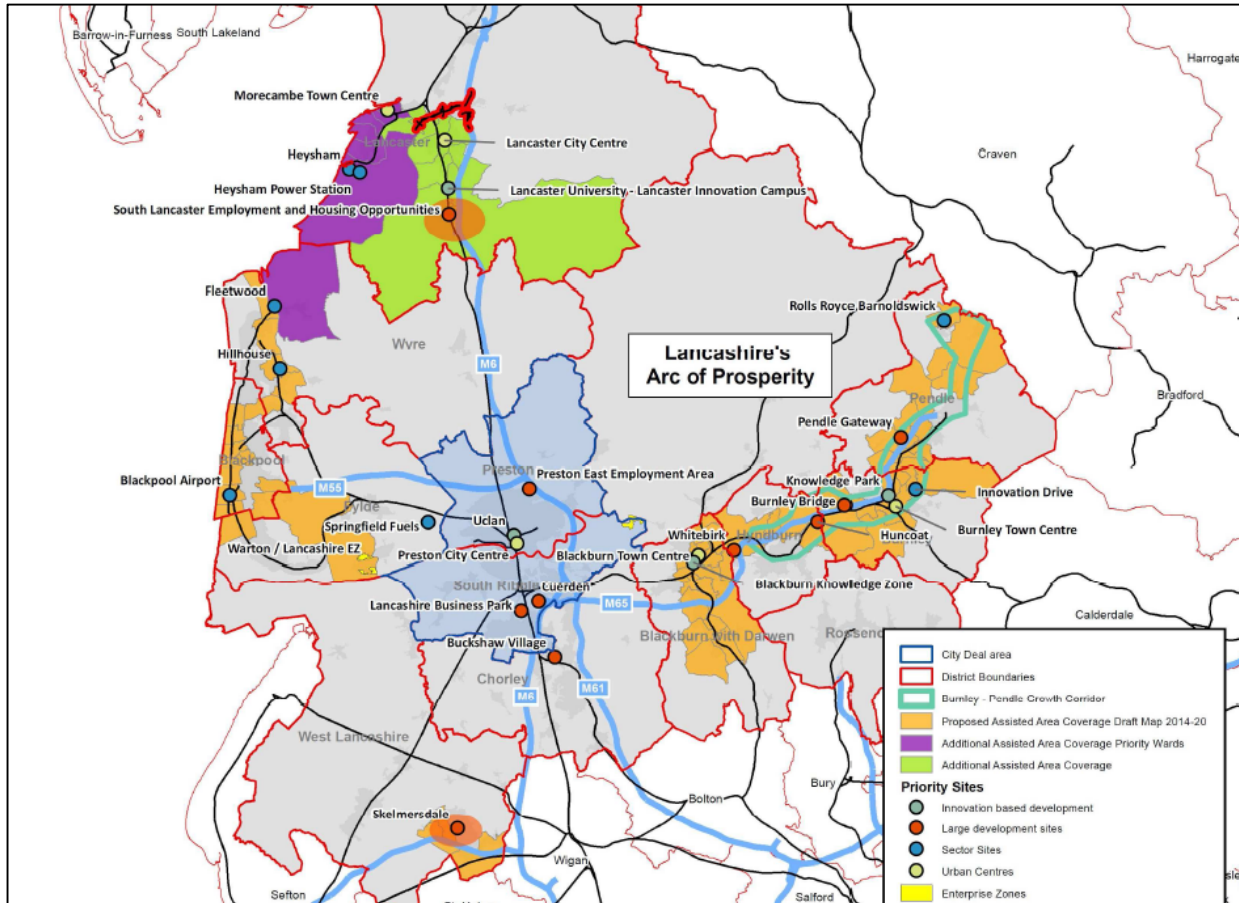
Lancashire LEP SEP

- 4.4 The SEP's ambition is to "*re-establish Lancashire as an economic powerhouse and a national centre of excellence in advanced manufacturing by maximising its clear competitive strengths and capabilities in the aerospace, automotive, energy and health science related sectors*". The SEP seeks to deliver the following by 2025:
- 50,000 new jobs;
 - 40,000 new houses; and
 - £3 billion additional economic activity

- 4.5 It identifies an "arc of prosperity", which currently generates around 75% of Lancashire's wealth and

provides the primary focus of Lancashire's economic and housing growth plans and suggests that the LEP will "harness the power and potential of our national industrial hotspots; our key strategic sites; our key clusters of high value activity; and our internationally recognised centres of excellence in research and innovation". A plan illustrating the location of the arc of prosperity is presented below in figure 4.1. This clearly identifies a number of strategic employment sites, as well as a number of strategic transport investment priorities.

Figure 4.1: Lancashire's Arc of Prosperity (source: Lancashire SEP)



- 4.6 A key focus of the Arc is the M65 Growth Corridor and it is reported that along with the principal urban towns, this supports approximately 80% of East Lancashire's jobs. A number of strategic employment sites are being delivered along this Corridor and it is suggested that this will be critical to securing the continued growth and expansion of East Lancashire's advanced manufacturing base. It is suggested that East Lancashire has the potential to generate almost 10,000 jobs and over £500m in GVA through delivery of key employment sites located along the M65 Growth Corridor.
- 4.7 In addition to the Arc of Prosperity, the Preston, South Ribble and Lancashire City Deal has established a £340m Infrastructure and Delivery Programme and £100m Investment Fund to help generate over 20,000 new jobs and deliver 17,420 new homes. There are also wider plans for significant growth around locations such as Lancaster and the Enterprise Zone sites at Blackpool, Samlesbury, Warton and Thornton Clevellys. The SEP focuses on the growth opportunities presented by key sectors including aerospace, automotive and energy and identifies a number of key strategic projects to support their growth. The SEP identifies the importance of ensuring that major transport projects and investments are fully aligned with the delivery of key economic and housing growth priorities across Lancashire.

4.8 In terms of transport connectivity, the SEP identifies the following points of relevance to this commission:

- East-west connectivity across Lancashire focuses on the M55 and M65 motorways and parallel railway lines that link Blackpool and Preston with Blackburn and Burnley. The M65 terminates abruptly at Colne, with onward connectivity into Yorkshire largely ineffective.
- **Road and rail links eastward into the Leeds City Region are largely ineffective and are of much lower quality than links further south** between Liverpool, Manchester and Leeds, Sheffield and the Humber ports.
- Elsewhere, **the quality of many local rail services and infrastructure leaves much to be desired**, and although some improvements are currently underway, for example, electrification of the lines linking Blackpool and Preston with Manchester and Liverpool, **East Lancashire in particular faces many more years with rail connectivity limited by speed, frequency and poor rolling stock quality. This risks significantly undermining the economic productivity and competitiveness of Lancashire as a whole.**
- In urban areas such as Preston and Lancaster, congestion has reached a point where it is reducing the reliability and therefore attractiveness of the local bus networks.
- Whilst Lancashire has benefitted in recent years from key transport and infrastructure schemes of national significance, **this masks a collective failure to secure the necessary investment in critical local transport infrastructure over recent decades.**
- **The failure to deliver the transport infrastructure needed to support sustained business success, it is estimated by the SEP, accounts for one-quarter of Lancashire's current economic performance gap with the rest of the UK**
- The LEP's work to bring forward high quality opportunities consistent with market requirements indicates East Lancashire can grow its existing advanced manufacturing clusters and attract new industrial occupiers, if there are significant improvements in the local transport infrastructure
- **There remains a strong perception locally that East Lancashire is poorly connected, with both road and rail networks hindering the efficient movement of people and goods, and that this relative isolation is having a negative impact on economic development, impeding East Lancashire's communities from fully benefiting from economic growth opportunities**
- Whilst road links to the west and south are of reasonable standard, rail links are much less adequate or non-existent. Journey times to Preston, Manchester and Leeds are lengthy and for some require a change of train. Fast, frequent and reliable access by train to Manchester Airport is of critical importance, yet there are currently no through services from east Lancashire.
- **Such factors all serve to heighten the sense of isolation and the perception of East Lancashire as an area of localised labour markets, narrow travel horizons and limited interaction with the adjacent economies of Manchester, Leeds and Central Lancashire. If Lancashire is to maintain its position as a national leader for advanced manufacturing, investment in East Lancashire's transport infrastructure will be vital to ensure the critical mass of businesses within the sector can continue to operate, invest, expand and grow, and that local people can easily access local job opportunities.**

Leeds City Region (LCR) SEP

4.9 The LCR is seeking to deliver the following by 2036:

- Creation of 35,700 net additional jobs
- Additional £3.7bn of annual economic output per annum
- Exceed the national average on high level skills
- To become a positive, above average contributor to the UK economy.

4.10 It identifies an ambition to deliver “good growth” and defines this below in figure 4.2. It is considered that enhanced transport connectivity could contribute to all of these input factors to “good growth”.

Figure 4.2: LCR SEP articulation of its ambition for “good growth”



4.11 The SEP identifies 4 key priorities as below:

- 1 - Growing Business
- 2 - Skilled People, Better Jobs
- 3 - Clean Energy and Environmental Resilience
- 4 - Infrastructure for Growth

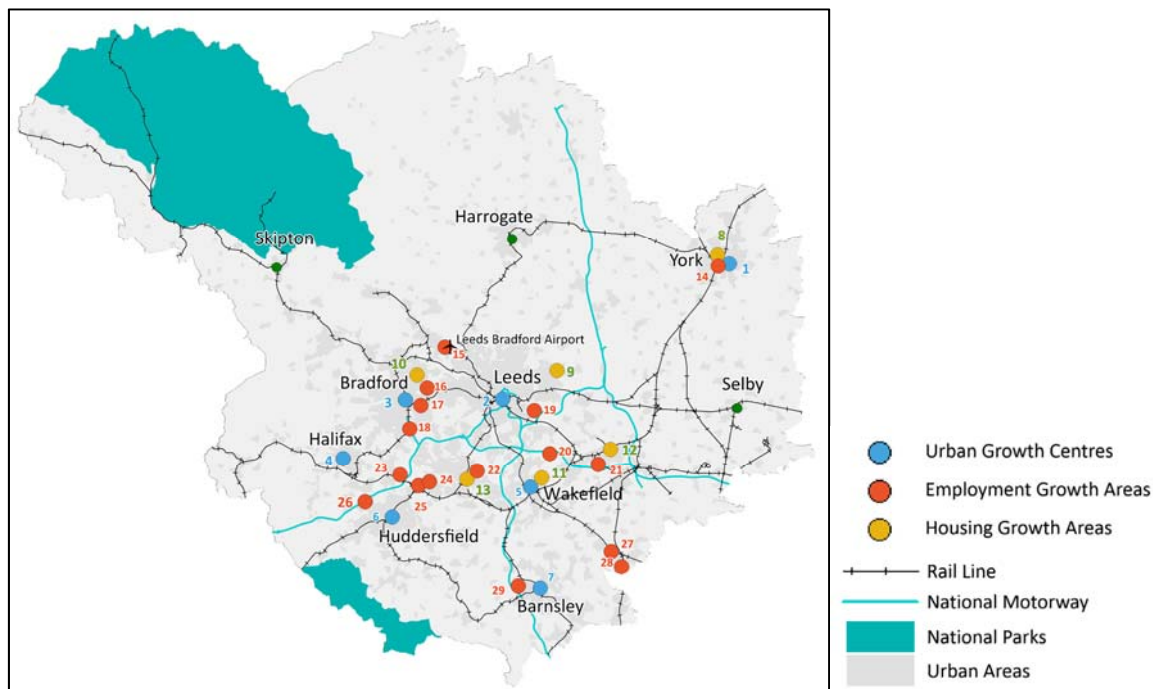
4.12 Under Priority 4, it refers to the need to focus on 3 types of spatial priority areas for growth:

- urban growth centres
- housing growth areas (refers to the need for 10-13,000 new homes per year across the LCR)
- employment growth areas

4.13 Under this priority, it also focuses on the need to focus on developing the City Region's transport infrastructure, identifying that **high quality and connected places are intrinsic to good growth**. Priority 4 adopts an integrated approach to connecting jobs and homes, with a focus on spatial priority areas and maximising benefits from new transport investment. It suggests that a priority action is to maximise opportunities and improvements through investment across modes beyond the Transport Fund, e.g. HS2, Northern Powerhouse Rail, Transport for the North, smart motorways, smart ticketing, improved rail franchises and improved bus services.

4.14 Figure 4.3 below identifies the priority spatial areas for growth within the LCR. It is clear that many of these are clustered around the Leeds/Bradford/Wakefield/Kirklees areas but there are also strategic growth areas further afield, e.g. York City Centre with the York Central site.

Figure 4.3: Identified priority spatial areas for growth within the LCR (source: LCR SEP, May 2016)



4.15 The SEP identifies an objective that “*places will be connected by high quality transport and wider infrastructure that serves the needs of businesses and people*”. It suggests the following in terms of transport connectivity of relevance to this study:

- ***There are major challenges in road and rail congestion and intra-City Region connectivity***, but significant opportunities from delivery of the West Yorkshire plus Transport Fund, HS2 and HS3, franchise improvements, and other schemes.
- ***Connectivity remains a barrier to business growth and competitiveness***
- ***Decades of underinvestment in strategic transport infrastructure have restricted connectivity, both within the City Region and to other parts of the UK*** and the rest of the world. Transport investment per capita in Yorkshire and Humber is only 45% of that in London, for example. These issues will only partially be rectified by the West Yorkshire plus Transport Fund.
- ***High quality infrastructure is the ‘bedrock’ upon which economic success is built***

York, North Yorkshire and East Riding SEP

4.16 The SEP identifies four clear ambitions to achieve by 2021:

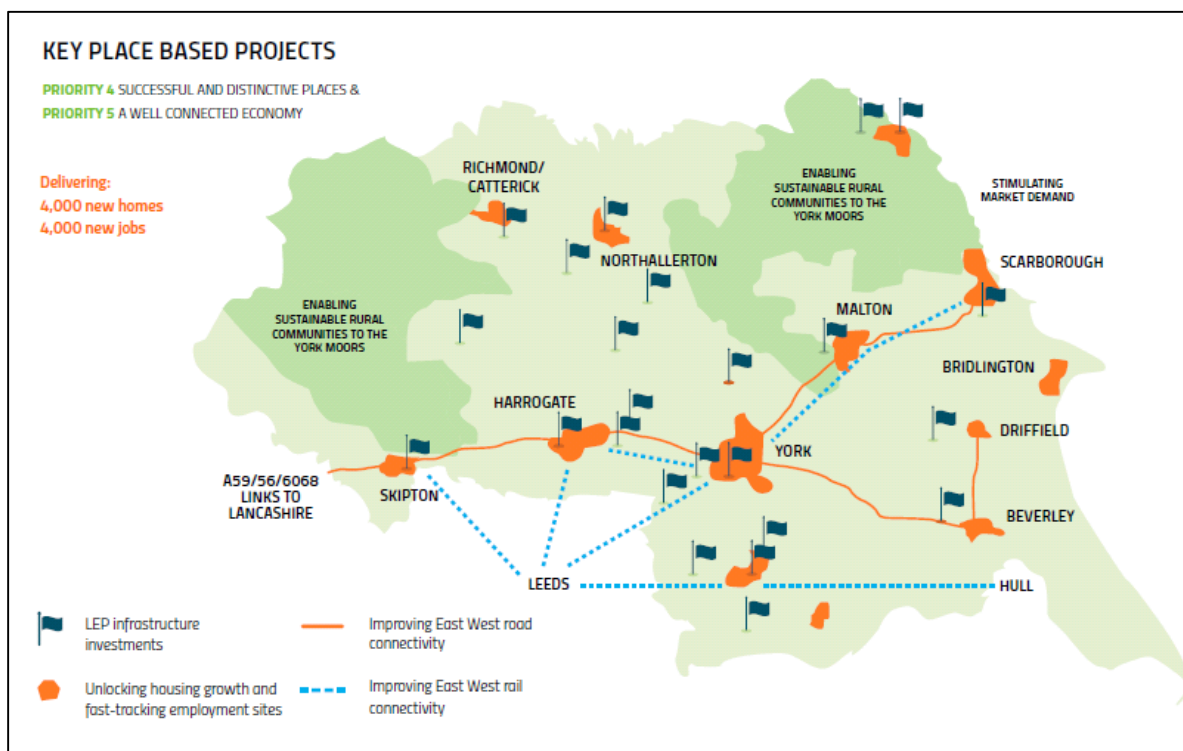
- Create 20,000 new jobs
- Deliver £3 billion growth
- Connect every student to business
- Double house building

4.17 It identifies 5 priorities to achieve this, as below:

- Priority 1 – Profitable and ambitious small and micro businesses
- Priority 2 – A global leader in food manufacturing, agri-tech and biorenewables
- Priority 3 – Inspired people
- Priority 4 – Successful and distinctive places
- Priority 5 – A well connected economy

- 4.18 Under priority 5, it is identified that businesses need to move goods, people, and information quickly, easily and reliably if they are to realise their growth potential. Under priority 2, there is a recognised need to facilitate connections between agri-food / biorenewables businesses and support supply chains interventions. Attracting investment to the LEP area is identified as being key including new businesses locating to key sites.
- 4.19 Figure 4.4 below identifies the key place based priority projects within the LEP area, with the aim of delivering 4,000 new homes and 4,000 new jobs. This includes major strategic employment sites such as the York Central Enterprise Zone and the Malton Food Enterprise Zone. This also presents the proposals for improving East-West connectivity with a focus on the A59 not only within North Yorkshire, but also across to Lancashire to the west.

Figure 4.4: Key place based projects within the LEP area (source: SEP Update, 2016).



4.20 The SEP suggests the following in terms of transport connectivity of relevance to this study:

- **The need to improve east west connectivity (road and rail), particularly between towns and their neighbouring cities. It is paramount to improve East-West transport connections across the entirety of the LEP area**, with the primary focus on routes between towns and cities: specifically the A64, A164, A1079, A1237 and A59 road corridors and the Leeds-Harrogate-York, York-Scarborough and Leeds-Selby-Hull rail corridors
- Ease congestion in York and Harrogate - there are major improvements needed to add capacity to A1237 around York Ring Road and A59 / A61 Harrogate Relief Road.
- **The need to enhance the resilience and reliability of the road network** and to improve journey time reliability on the A64, A1079 and A59 road corridors
- The SEP recognises the need to support the ambitions of its many great small and micro businesses. It suggests that **connectivity is key to enable small and micro businesses to grow and compete in national and international markets.**

- It is also important to recognise, that whilst our North South connections are strong, **poor East-West connectivity to some of the towns and remote rural areas mean that major growth opportunities are less likely.**
- There is a focus in ensuring rural connectivity to North Yorkshire growth centres
- **Businesses need to move goods, people, and information quickly, easily and reliably if they are to realise their growth potential. Ensuring our transport networks are fast and effective is therefore a vital enabler of growth.**
- Clearly, transport networks span beyond our LEP boundaries, so there is significant overlap with neighbouring areas. The LEP is therefore working closely with other LEPs and through Transport for the North to realise our ambitions.
- The LEP will continue to stimulate support rural economies by Creating excellent transport links to employment/urban hubs
- **Accessibility is seen as a barrier to employment. Links to neighbouring areas have also been identified as key to economic growth yet hindered by underinvestment.** One location on the A59 to the west of Skipton has average daily traffic flows of 16,000 vehicles despite being a single carriageway road. This exceeds many key east west connections in Northern England and is even higher than dualled sections of the A66.

Independent Economic Review (IER)

- 4.21 In 2015, Transport for the North (TfN) on behalf of wider partners, commissioned consultants to undertake an Independent Economic Review (IER) of the Northern Powerhouse economy. The purpose of this was to establish the Northern economy's position and the drivers underpinning its performance and to identify opportunities where 'pan-Northern' activity could drive economic outputs for the mutual benefit of all.
- 4.22 The IER reports that the North's GVA per capita has been consistently about 25% below the national average and between 10-15% below the national average excluding London. It suggests that the North's 'growth gap' widened since the recession in GVA, employment and working age population terms. It explains that this is due to lower levels of productivity as well as employment and it is suggested that some literature points to large numbers of people becoming detached from the labour market in the North of England.
- 4.23 The Review points to lower levels of agglomeration as a reason for the North's 'performance gap' with the rest of the England and references a strong link between areas with high levels of agglomeration and strong connectivity. It is suggested that "*because the North is fragmented by poor transport links between key settlements, the economy as a whole is failing to gain the agglomeration effects which would help to increase its productivity*". The IER also reports that "*Better transport connectivity can help to promote a higher employment rate, by improving access to centres of employment, and it can help to promote higher productivity, by improving the attractiveness of an area for investment, improving access to markets, increasing the pool of workers available to work in higher productivity urban locations, and increasing the effective scale of cities and the associated benefits of agglomeration*".
- 4.24 The IER identifies four 'Prime' Capabilities whereby there is considered to be a differentiated and distinctive offer at a pan-Northern level. It is suggested that these capabilities also perform well on productivity, and can compete at national and international scales and include:
- Advanced Manufacturing, with a particular focus on materials and processes
 - Energy, in particular expertise around generation, storage, and low carbon technologies and processes, especially in nuclear and offshore wind
 - Health Innovation, with a focus on Life Sciences, Medical Technologies/Devices, e-health

- Digital, focusing in particular on computation, software tools/design and content, data analytics, and simulation/modelling, and wider strengths in media.
- 4.25 In addition to these, there are three ‘Enabling’ Capabilities identified which will play a critical role in supporting the growth and development of the ‘prime’ capabilities. These are: Financial and Professional Services, Logistics, and Education (primarily Higher Education). The IER reports that overall, the ‘Prime’ and ‘Enabling’ Capabilities account for 2.1m jobs and just over £100bn in GVA, representing around 30% of all jobs in the north and just over 35% of GVA.
- 4.26 The Review points to a number of complementary sector specialisms across the Northern LEPs including Advanced Manufacturing, Advanced Materials, and Energy. Other specialisms are evident in a number of areas within – rather than across – the North, including Life Sciences and Pharmaceuticals, Healthcare Technologies, Digital, Logistics and Tourism. Other sectors which were identified as being prioritised by some LEP areas, but are less widespread across the North, include Agri-Tech and Financial and Professional Services.
- 4.27 The IER sets out a ‘transformational’ economic future for the North, in which it assumes improvements in the skills base, in innovation performance, and in transport connectivity, suggesting that this could raise the growth rate of the North’s productivity and close the gap with the rest of England. It is suggested that transformational improvements to the North’s transport connectivity are critical, both between and within cities and this should include enhanced pan-Northern city-centre to city-centre rail links, east-west and north-south to promote increased agglomeration. It is reported that better transport connectivity within and between cities matters for the North’s growth prospects for a number of reasons including:
- investment in skills is more likely where there is access to well-paid jobs;
 - foreign investors are more likely to be attracted to locations that are well connected to global markets, with access to a well-qualified workforce;
 - firms are more likely to specialise and innovate in areas with deep and extensive labour markets.
- 4.28 Whilst there is a focus on city-to-city connectivity, it is also recognised that the Advanced Manufacturing and Logistics capabilities are typically located in out-of-town locations, where good access to, and connectivity between, road and/or rail networks beyond the cities is also key. It is reported that the majority of trips in the North are made by road and that targeted investment in new road infrastructure is required to “*improve the reliability and resilience of road travel, reduce journey times and improve the connections offered by the North’s road networks*”. The Review acknowledges that growth ‘Prime’ and ‘Enabling’ Capabilities is also expected to lead to increased demand for business-to-business travel and that global connectivity beyond the North (i.e. through ports and airports) is also key to realise the opportunities that exist.

Northern Powerhouse Strategy (November 2016)

- 4.29 This was published by Government as part of the Autumn Budget 2016 and is intended to support Government’s committed focus on the principle of a Northern Powerhouse, with the objective to achieve a sustained increase in productivity across the whole of the North. The strategy sets out Government’s priorities for delivering this vision and recognises the significant potential of the Northern Powerhouse, suggesting that the North of England:
- Is home to over 15 million people and over one million private sector businesses.
 - It contains five of the UK’s ten largest cities.

- Has an economy worth £304 billion in 2014, accounting for 19% of the UK's output
 - Produces 19% of UK goods exports, and is connected to the rest of the world through seven international airports and 12 major ports. There are over 20 universities in the North, of which four are ranked in the top 100 universities globally.
- 4.30 The Strategy recognises that the North faces a number of barriers to productivity, one of which is connectivity. It identifies that the North's economy is fragmented and that employers in northern cities draw workers from smaller areas than in the South, suggesting that this limited reach of northern cities' labour markets means that workers choose from fewer employers, and vice versa, holding back wages and productivity. It suggests that *"commuting between towns, counties and cities in the North is constrained by the poor transport infrastructure and that this makes it harder for people to find jobs, for firms to find workers, and for ideas to be shared and developed. Ultimately, this lack of connectivity is holding back growth and productivity"*.
- 4.31 As part of its commitment to enhancing connectivity, it is suggested that Government will *"continue to consider other routes across the Pennines"*.

Science and Innovation Audit (SIAs) – Lancashire and Sheffield City Region

- 4.32 In Autumn 2015, Government announced it was to commission a number of regional Science and Innovation Audits (SIAs) as part of a new approach to regional economic development. The initial wave of 5 Government funded SIAs was undertaken in 2016, to assist regions to map their research and innovation strengths and identify areas of potential global competitive advantage. Lancashire and the Sheffield City Region (SCR) successfully bid for an SIA focused on high value manufacturing activity.
- 4.33 The joint Lancashire and SCR SIA vision is for a *"Northern Advanced Manufacturing Innovation Corridor"*, to bring *"existing, emerging and new science and innovation assets and programmes into collaboration with industry to drive productivity growth in advanced manufacturing and key linked sectors across the region to world-class levels"*. The SIA is anchored around the Advanced Manufacturing Research Centre and associated activity in Sheffield and the proposals for a new Northwest Advanced Manufacturing Research Centre at Samlesbury, as well as a wide range of other existing and proposed science and manufacturing based innovation and R&D facilities. It is considered that there is a unique opportunity between the geographies of the Sheffield City Region and Lancashire to create this 'Innovation Corridor'. It is suggested that its successful delivery requires a *"high level of interconnected physical, economic and networking assets"*, given that Innovation Districts are proposed at each end of the proposed corridor and there is a need to connect the two. This infers the requirement for enhanced East West connectivity to ensure that the two locations are physically accessible to one another to ensure that the impact of the Corridor is maximised to the benefit of the Northern and UK economies.
- 4.34 The SIA points out that in both regions, there is a focus on high value manufacturing and that the aerospace, nuclear and healthcare technology sectors are of national significance. It is reported that Lancashire and the SCR have a concentration of innovative manufacturing SMEs that operate in the supply chains of these sectors, as well as a number of globally significant primes.

Pennine Lancashire Growth and Prosperity Plan 2016-2032

- 4.35 The Pennine Lancashire Growth and Prosperity Plan was developed by Pennine Lancashire Local Authority Leaders and Chief Executives and covers the five local authority areas of Blackburn with Darwen, Burnley, Hyndburn, Pendle and Rossendale and includes Lancashire County Council. The Growth and Prosperity Plan identifies an ambition to accelerate economic growth and housing

development in Pennine Lancashire, closing the productivity gap and ensuring that the economy can capitalise upon its strengths as a major contributor to the Lancashire Economy and beyond.

- 4.36 The Plan identifies that Pennine Lancashire is home to almost half a million people, equating to a third of Lancashire’s total population, with around 213,000 employee jobs, providing 29% of Lancashire’s employment and contributing £7bn per annum in GVA. It is the largest contributor of GVA of any sub-area within Lancashire. It is reported that the advanced manufacturing/engineering sector accounts for 20% of all employment and is growing.
- 4.37 The Plan aims to deliver the following across Pennine Lancashire by 2032:
- 28,000 new homes
 - 1.28 million m2 of new commercial floorspace
 - 14,000 new jobs
 - £500 million additional GVA pa

4.38 It is evident that housing and employment growth is a critical component of the Growth and Prosperity Plan and it has identified a number of areas for spatial growth, as set out below in figure 4.4:

Figure 4.4: Key identified strategic employment and housing sites within Pennine Lancashire:



4.39 The Plan comprises four strategic objectives, one of which is entitled “Connectivity and Infrastructure”. The Plan acknowledges that in order to achieve its growth ambitions and to maximise the area’s advantages of being located at the centre of the Northern Powerhouse, there is a need for a “major infrastructure investment programme” to ensure that it is well connected and resilient. The Plan refers to the need for improved East-West connectivity and the need to focus on connectivity to the region’s strategic transport hubs (ports, airports, HS2 hubs etc). The Plan suggests that Pennine Lancashire will work with partners on both sides of the Pennines to develop options and a business case for improved connectivity between Pennine Lancashire and the Leeds City Region and to unlock new housing and employment sites.

Building our Industrial Strategy – Green Paper (January 2017)

4.40 UK Government published this Green Paper in January 2017 as part of its commitment to the promotion of industrial activity as a key driver of the UK economy. It recognises that in industrial sectors from automotive and aerospace to financial and professional services and the creative industries, the UK has built a global reputation but the competition for new investment is “fierce and unending”. It recognises the need to ensure that the UK is one of the most competitive places in the

world to start or to grow a business and also acknowledges that the Government has for some time worked collaboratively with industries such as aerospace and automotive to create some of the world's best environments for advanced engineering.

4.41 The Strategy identifies 10 key "pillars" as drivers of growth, two of which are particularly relevant and are presented below in brief:

- **Pillar 3 – Upgrading infrastructure** – the strategy recognises the need to upgrade the UK's digital, energy, transport, water and flood defence infrastructure and to better align central government infrastructure investment with local growth priorities. It identifies that investment in economic infrastructure is a key part of industrial strategy and that good transport infrastructure does not just reduce delays; it can raise productivity by enabling towns and cities to achieve agglomeration effects, and so support the rebalancing of our economy.

It is suggested that better connected towns and cities have deeper labour markets, greater competition and greater economies of scale, leading to higher growth and living standards and that the quality of our transport infrastructure has been rated as second lowest among G7 countries. It is suggested that infrastructure decisions will be better matched with local economic plans to boost productivity locally and support places that have suffered historical under-investment. The Strategy identifies that Government will continue to prioritise the highest value-for-money projects, address productivity weaknesses across the country and unlock the benefits of agglomeration economies.

- **Pillar 9 - Driving growth across the whole country** – the strategy identifies that Government will tackle historic underinvestment and provide development funding for major infrastructure upgrades such as the Midlands Rail Hub and Northern Powerhouse Rail. It is suggested that it will continue to support better local decision-making structures for infrastructure planning, including the new mayoral combined authorities, and regional bodies like Midlands Connect and Transport for the North. The Strategy recognises that weaknesses in infrastructure and connectivity can limit growth in areas with lower productivity and that poor transport means a shallower labour market and less choice and competition.

Relevant Transport Policy/Strategy Context

Pan-Northern transport strategy

4.42 The Northern Transport Strategy (2016) outlines that east – west links are a constraint on the northern economy:

'The number, capacity, and reliability of east - west road connections are seen as a constraint on the Northern economy. The M62 is the only east-west motorway spanning the North and part of the EU designated trans-European network (T-TEN) linking Ireland to mainland Europe.'

4.43 On the 28th November 2016 Highways England published the *Northern Trans-Pennine Routes Strategic Study*, jointly promoted by the Department for Transport and Transport for the North. The Northern Trans-Pennine study considers the case for making improvements to the A66 and A69, the two parallel routes to the north of the east-west corridor under consideration in this study. The Northern Trans-Pennine study identifies a number of potential transport interventions for the two Trans-Pennine routes, including completion of the dualling of the A66 and A69. Both roads lie a considerable distance to the north of the corridor under consideration here, and neither is likely to be a reasonable alternative for many of the journeys currently using the M65/A59/A65 corridor. Nevertheless, this consideration of improving Trans-Pennine routes and the proposed investment detailed below serves to emphasise the importance of east-west connectivity in the North of England,

and the importance of the availability of a number of viable routes across the Pennines.

- 4.44 On the same day, the Department for Transport announced, on the back of strategic study results, that the A66 will be upgraded to create a new east to west dual carriageway (costed at £825m in the study), meaning a quicker link between Scotch Corner in North Yorkshire and Penrith, Cumbria. The Department for Transport also announced that it plans to enhance junctions on the A69 to improve the route between Newcastle and Hexham, to be complete by 2020. The A69 improvements are a major part of Highways England's £220 million to combat congestion at pinch points on motorways and major A roads. The A66 dualling enhancements are also referenced as a priority within the recently published Industrial Strategy Green Paper (January 2017).

Lancashire transport policy

- 4.45 There is growing awareness of the importance of the east-west transport corridor linking Central Lancashire with North Yorkshire and the Leeds City Region. This is focused on the M65 and A59 and parallel rail routes including the 'Calder Valley' line linking Preston, Blackburn and Burnley with West Yorkshire. The transport challenges, barriers and constraints are detailed in the East Lancashire Highways and Transport Masterplan (2014), and are discussed in more detail in chapter 5 that follows, but in combination result in routes, both road and rail, being slow, unreliable, and lacking resilience when incidents occur and during some peak flow periods. These peaks are getting longer, and traffic is growing on less suitable routes as people try and avoid traffic jams. At present around 70 per cent of commuter journeys are made by car, even in areas of low car ownership where car sharing is more common. The overriding consequence of these transport constraints is a strong perception locally that the transport network hinders the efficient movement of people and goods, and that this poor connectivity is having a negative impact on economic development and regeneration in parts of East Lancashire.

East – West connectivity interventions

- 4.46 Some investment in the transport infrastructure within the corridor has been delivered, and there are also historic proposals for further investment. In detail:
- Lancashire County Council has a longstanding proposal to construct a new single carriageway road between the M65 terminus in Colne and the Lancashire-North Yorkshire boundary north of Earby. This scheme (known as the Colne Foulridge Bypass) is referenced in the Lancashire Strategic Economic Plan;
 - The Heysham to M6 Link Road was opened in 2016. The new road completes the long awaited connection from the Heysham and Morecambe peninsula to Junction 34 of the M6, and improves east – west connectivity on this route.

North Yorkshire transport policy

- 4.47 For North Yorkshire, the York North Yorkshire & East Riding Strategic Economic Plan (SEP) identifies the A64 - A1237 – A59 linking Scarborough, York, the A1(M), Harrogate, Skipton and East Lancashire as the priority east – west highway corridor in North Yorkshire. The Strategic Transport Prospectus for North Yorkshire acknowledges that the east coast communities and Craven district are disadvantaged by poor east – west transport links. This contributes significantly to underperforming economies in both the east (Scarborough and Ryedale) and west (Craven and Richmondshire). Poor cross-Pennine links between Craven District and East Lancashire are also acknowledged as acting as a constraint on these areas.
- 4.48 The SEP outlines five priorities to support growth in the North Yorkshire economy. Priority 5 specifically outlines plans for overcoming connectivity issues in North Yorkshire. The focus for the

period 2016–2021 is to improve east – west connectivity, particularly between towns and their neighbouring cities. The primary focus will specifically be on the A64, A164, A1079, A1237 and A59 road corridors and the Leeds-Harrogate-York, York-Scarborough, and Leeds-Selby-Hull rail corridors.

East – west connectivity interventions

4.49 The Strategic Transport Prospectus for North Yorkshire outlines a range of transport interventions across two timescales – those for implementation between now and 2030, and longer term for implementation between 2030 and 2045:

- In the period 2016 – 2030 North Yorkshire will focus upon improving journey time reliability on east – west links. An approach of identifying and developing proposals to increase overtaking opportunities on these roads has been taken. This includes schemes for the A64 between Malton and York and on the A59 three additional climbing lanes have been identified between Harrogate and Skipton. Rail improvements between Scarborough and York, and York–Harrogate–Leeds will also be targeted.
- In the period 2030 to 2045 North Yorkshire will focus on improved east – west road and rail links to Whitby to further enhance access to the rural economy, York Potash and off shore wind industry. In addition, improved east - west road and rail linkages between the A1(M), Selby and Hull will be sought to better link West Yorkshire and the Humber.

4.50 The North Yorkshire LTP4 outlines further strategic future east – west improvements:

- Development of proposals for improvements to east - west corridors from the eastern boundaries to the boundary with Lancashire;
- Exploration of options for improving links from Skipton and South Craven to Lancashire along the A59, A56 and A6068 corridors;
- Review and further develop proposals for a Harrogate Relief Road, to help ease congestion through Harrogate Town Centre, which would address both urban congestion issues as well as improving journey time reliability along the A59 east - west corridor;
- In the longer term the LTP4 proposes to significantly improve cross Pennine connectivity between Craven and East Lancashire, which may include the potential reopening of the Skipton - Colne Railway.

Leeds City Region transport policy

4.51 The West Yorkshire Transport Strategy (2016 consultation draft) highlights the importance of the western parts of the Leeds City Region to the city region's future economic growth. The strategy identifies the importance of both Bradford and Calderdale to the growing economy.

4.52 The strategy notes that there will be jobs and housing growth in Airedale at Shipley, Bingley and Keighley. This is however subject to the caveat that Bradford district's relatively poor connectivity onto the regional and national road and rail networks presently constrains economic growth. While Bradford already benefits from the electrified Airedale and Wharfedale rail lines, east-west connections to the core cities of Leeds and Manchester and to Manchester Airport from both Calderdale and Bradford are less effective.

4.53 Improving transport connectivity within West Yorkshire, including on east-west routes to and from Manchester for example, is identified as being 'key to supporting Calderdale's existing economic activity and facilitating growth', again subject to the caveat that important road corridors are operating at capacity and journeys can be unreliable. Rail is also growing in importance for Calderdale residents,

particularly for longer, cross-boundary journeys. Alongside longer term transformational projects such as Northern Powerhouse Rail, the electrification of the Calder Valley line is critical in addressing these connectivity issues.

East – west connectivity interventions

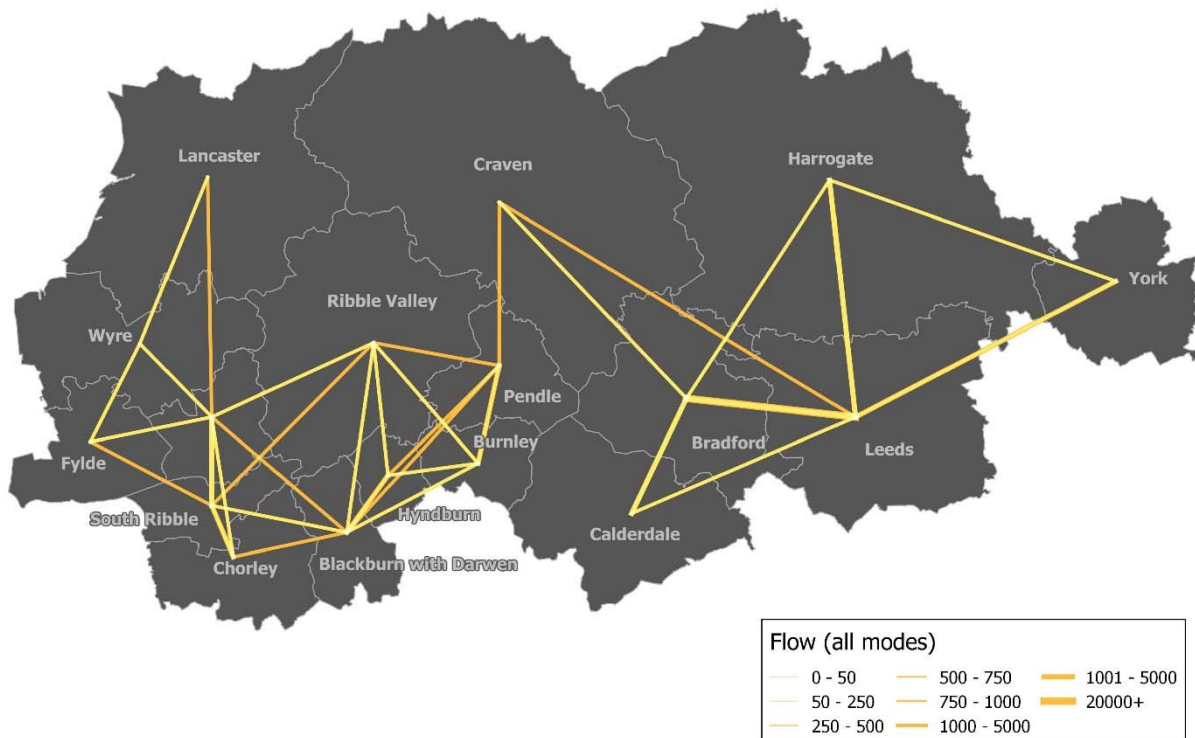
- 4.54 WYCA's Leeds City Region Metro Study (2016) identifies that amongst priorities for future scheme development should be reducing journey times and increasing frequency on the Calder Valley route linking the hubs of Halifax, Bradford and Leeds. Speed and frequency improvements and new trains expected to be in place by the end of 2019, and signalling and line speed investments on the Calder Valley Line are programmed in the West Yorkshire Transport Strategy during the period 2016-2021.
- 4.55 Nevertheless, the electrification of the Calder Valley line would improve connections to the core cities of Leeds and Manchester, and to Manchester Airport, and is identified as a priority in Leeds City region policies and plans including the West Yorkshire Transport Strategy (2016).

5.0 Current travel to work flows across the Central Corridor

Introduction and overview

- 5.1 Travel To Work (TTW) data by origin and destination has been used to analyse current labour market travel to work flows across the defined Central Corridor. It is important to understand the extent of the current movements across the Corridor, particularly on an East-West axis, as part of understanding what the potential could be going forward.
- 5.2 This travel to work data has been extracted both for all modes, and for rail users only, from Nomis at district level. GIS tools have been used to display connections between the districts. The line thickness has been graduated based on the size of the flow. In addition, orange lines represents a one-way flow, while the brighter yellow lines represent two-way flows. For this analysis internal trips, i.e. those that originate and end in the same district, have not been presented. Any references made to Yorkshire or Lancashire trip rates only include those districts present in the maps.
- 5.3 In summary, the TTW analysis clearly identifies a high level of self-containment across the Corridor across all transport modes, particularly between Lancashire and Yorkshire which appear to function in labour flow terms as two detached labour markets. This is likely to be a reflection of historic labour market/commuting patterns and the poor transport connectivity between the two (perhaps somewhat defined by the topographical challenges in part). There is increased cross border movement in the county border districts of Pendle, Calderdale and Craven, however at the eastern and western ends of the Corridor (i.e. Preston/Fylde/Wyre/York) cross county Trans-Pennine movements are very limited. Enhanced East-West connectivity is considered critical to addressing the current levels of self-containment to promote more flexible and integrated labour markets.

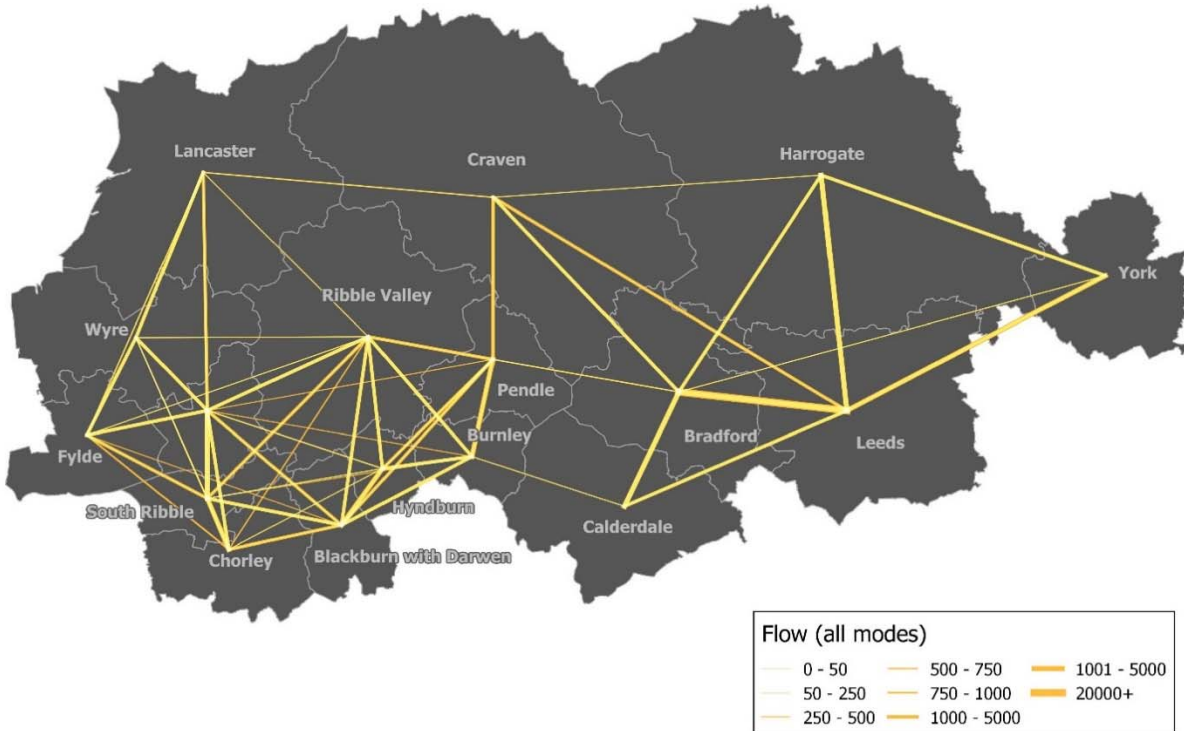
All modes analysis



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Figure 5.1 Three highest flow categories for all modes

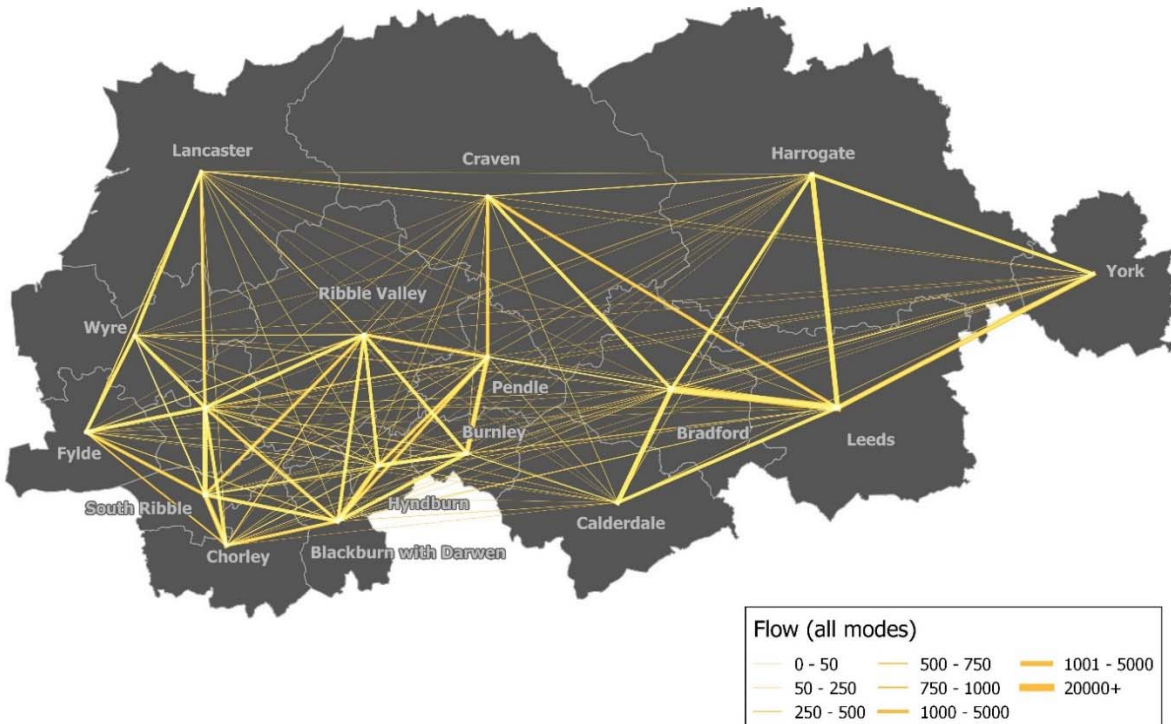
- 5.4 Figure 5.1 shows the three largest categories for daily flows defined within this study for all modes. From this, the Yorkshire and Lancashire flows appear to be fairly insular. The only interaction between Lancashire and Yorkshire at the 1,000 trip or more level is from Pendle to Craven (1,713 trips). However, to place this into perspective, this flow is dwarfed by the flows between Craven and West Yorkshire, with the two-way Craven-Bradford flow of 8,242 trips.
- 5.5 This level of self-containment is not unusual for the north of England. The Highways England report 'Trans-Pennine Tunnel Strategic Study' indicates that Leeds, Manchester, Sheffield, and Liverpool are all relatively self-contained in comparison to the Randstad in the Netherlands, where there is significant commuting between city regions. The report also notes that commuting between Leeds and Manchester is 40% below the expectations for regions of comparable size and proximity. Furthermore, Transport for the North presented a similar mapping exercise within the report 'The Northern Powerhouse: One Agenda, One Economy, One North' which showed that commuting between city regions across the north is limited. Finally, the Centre for Cities report 'Sink or Swim? What next for local enterprise partnerships?' provides a measure of containment for all Local Enterprise Partnerships (LEPs), with analysis based on the percentage of people who both live and work within the same LEP area. The three most self-contained LEPs are all located within the north (North Eastern, Cumbria, and Leeds City Region) and all have containment values above 90%.
- 5.6 To conclude on thoughts on containment, it is worth emphasising that while this significant level of self-containment is not unusual, it has been acknowledged at a pan-Northern level that this is a matter that should be addressed to help improve the economy of the north as a whole. This area should therefore be a part of any actions implemented to address the issue.



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Figure 5.2 Six highest flow categories for all modes

5.7 When the next three levels of daily flow are introduced, as shown in Figure 5.2, more cross movements between Lancashire and Yorkshire are evident, such as that between Bradford and Pendle. However, internal movements within Lancashire and Yorkshire remain predominant. Cross movements between Lancashire and Yorkshire for this level of daily flow only occur between districts on the border between Yorkshire and Lancashire.



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Figure 5.3 All flow categories for all modes

- 5.8 When all flow categories are introduced (Figure 5.3) many more movements between Lancashire and Yorkshire appear. At the origin level, 2% or less of the journeys that originate in a Lancashire district end in Yorkshire for all districts except for Burnley (6%), Lancaster (10%), and Pendle (23%). These patterns are similar when examining the districts as destinations. In Pendle, 86% and 84% of journeys to work to Pendle and Lancaster respectively started within Lancashire. For all other Lancashire districts this figure is over 97%.
- 5.9 Within Yorkshire, for most districts, less than 5% of flows originate from Lancashire except for Calderdale (6%) and Craven (33%). A summary of origins and destinations outside of the county by district is provided in Table 5.1.
- 5.10 The general pattern indicates that more movements across the counties occur in those districts located on the county boundary. Both Bradford and Leeds also draw in significantly sized flows from Lancashire.

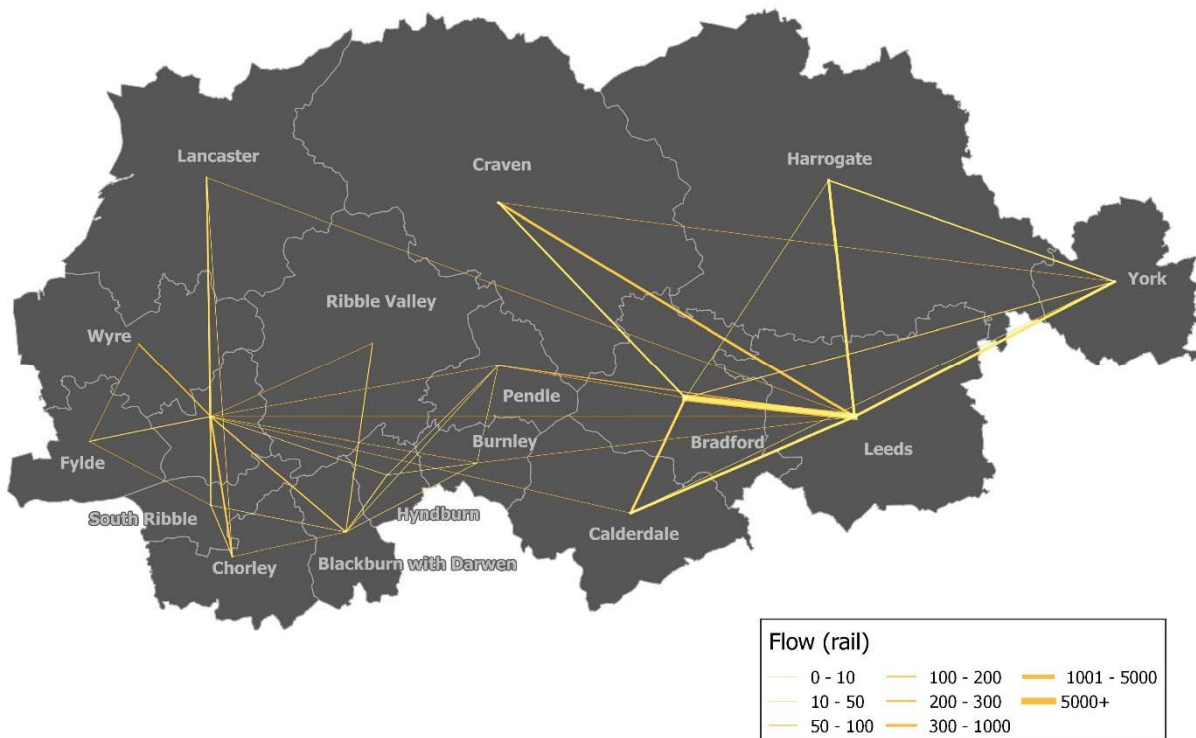
Table 5.1 All modes origins and destinations for the Lancashire authorities included in the study area

District	% of all flows that originate within the Yorkshire districts	% of all flows travelling outside of the Lancashire districts
Blackburn with Darwen	2%	2%
Burnley	6%	7%
Chorley	1%	1%
Fylde	1%	1%
Hyndburn	2%	2%
Lancaster	10%	16%
Pendle	23%	14%
Preston	1%	2%
Ribble Valley	4%	3%
South Ribble	0.7%	1%
Wyre	1%	1%

Table 5.2 All modes origins and destinations for the Yorkshire authorities included in the study area

District	% of all flows that originate within the Lancashire districts	% of all flows travelling outside of the Yorkshire districts
Bradford	2%	4%
Calderdale	7%	7%
Craven	23%	33%
Harrogate	1%	2%
Leeds	2%	2%
York	0.9%	2%
Preston	1%	2%

Rail only analysis



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Figure 5.4 Rail flows for 10 trips and above

5.11 Rail journeys to work (Figure 5.4) show a similar pattern to that presented for all flows. Internal flows within Yorkshire are more dominant in comparison to internal flows within Lancashire. This is dominated by flows to and from Leeds. There are nevertheless many smaller flows evident within Lancashire, with those to and from Preston being predominant. The analysis also illustrates the weak or absent rail services between Lancaster and Craven, and between Pendle and Craven. Overall, the rail flows do appear on the whole to be less insular than those presented for all modes as shown in Table 5.3.

Table 5.3 Rail flow origins and destinations for the Lancashire authorities included in the study area

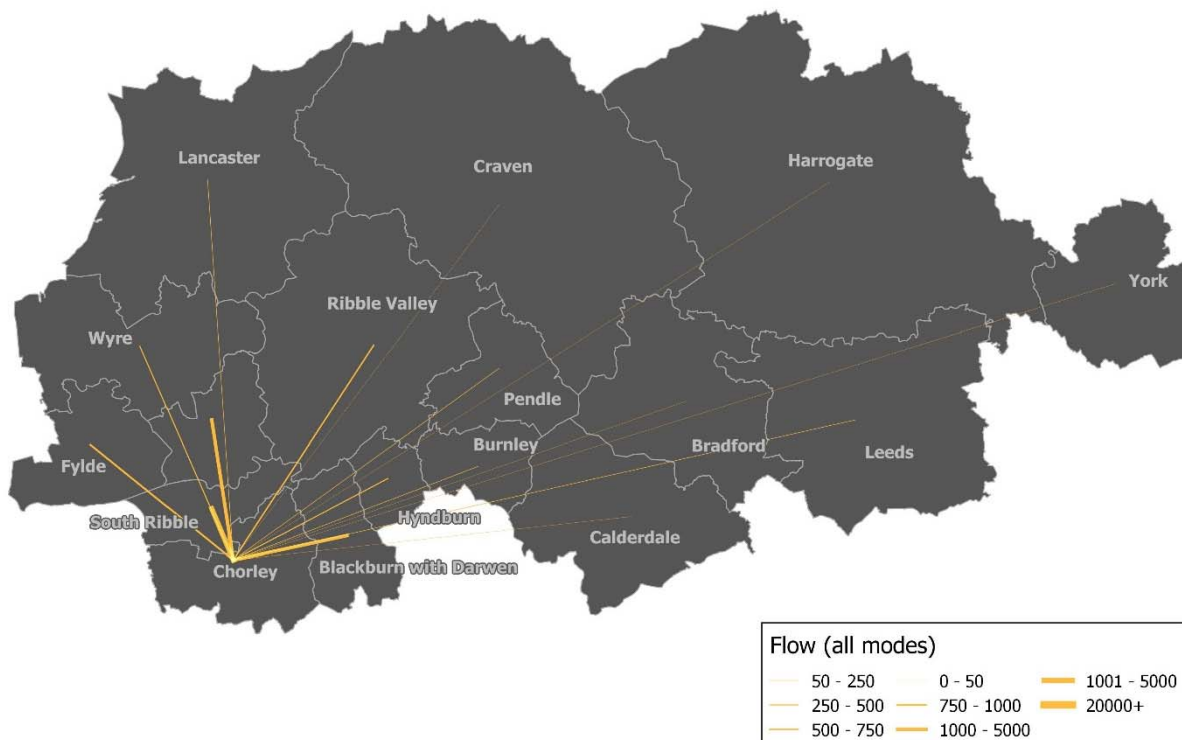
District	% of rail flows that originate within the Yorkshire districts	% of rail flows travelling outside of the Lancashire districts
Blackburn with Darwen	3%	8%
Burnley	11%	28%
Chorley	2%	3%
Fylde	3%	7%
Hyndburn	4%	7%
Lancaster	10%	4%
Pendle	8%	44%
Preston	5%	7%
Ribble Valley	3%	9%
South Ribble	1%	4%
Wyre	7%	4%

Table 5.4 Rail flow origins and destinations for the Yorkshire authorities included in the study area

District	% of rail flows that originate within the Lancashire districts	% of rail flows travelling outside of the Yorkshire districts
Bradford	2%	0.3%
Calderdale	5%	3%
Craven	4%	1%
Harrogate	1%	0.1%
Leeds	2%	1%
York	2%	0.4%
Preston	5%	7%

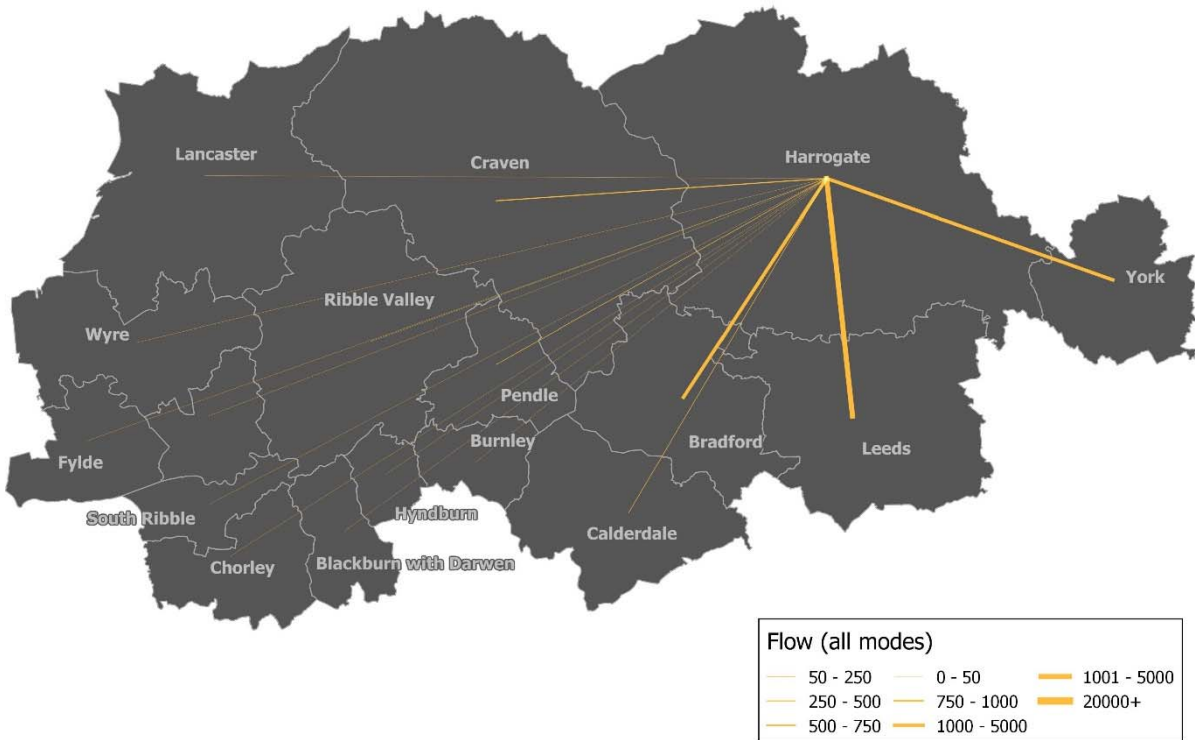
Analysis by District

5.12 Examining flows at an individual district level, those at the periphery of the study area (eastern Yorkshire and western Lancashire) tend to only attract and generate trips to and from the county in which they are located. This is especially prominent in York, Fylde, Wyre and South Ribble which do not have any flows above 50 trips to districts within the study area that lie outside of their county. As an illustration, daily work flows from Chorley, depicted below in Figure 5.5, only reaches Leeds at the 'over 50' level (57 trips), while Harrogate (Figure 5.6) only receives trips from Pendle at a similar level (79 trips).



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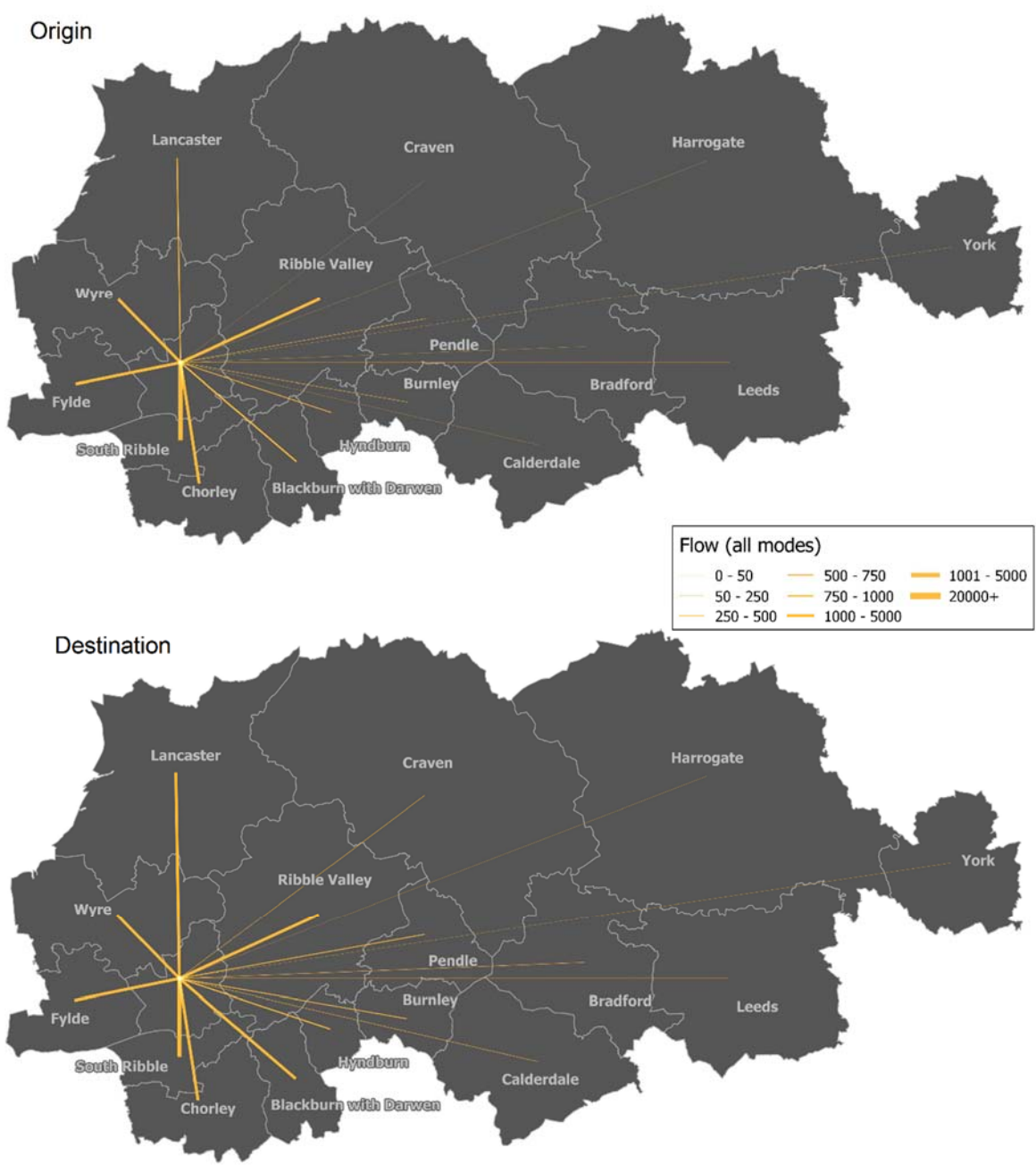
Figure 5.5 Flows from Chorley for all modes



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Figure 5.6 Flows to Harrogate for all modes

- 5.13 Even to and from Preston there is little significant interact with Yorkshire in an outbound direction. Only 198 trips (1.3% of Preston origins) end in Yorkshire. Preston does attract 477 journeys to work from the North and West Yorkshire districts included in this analysis, but this still only represents 1.2% of trips that end in Preston.

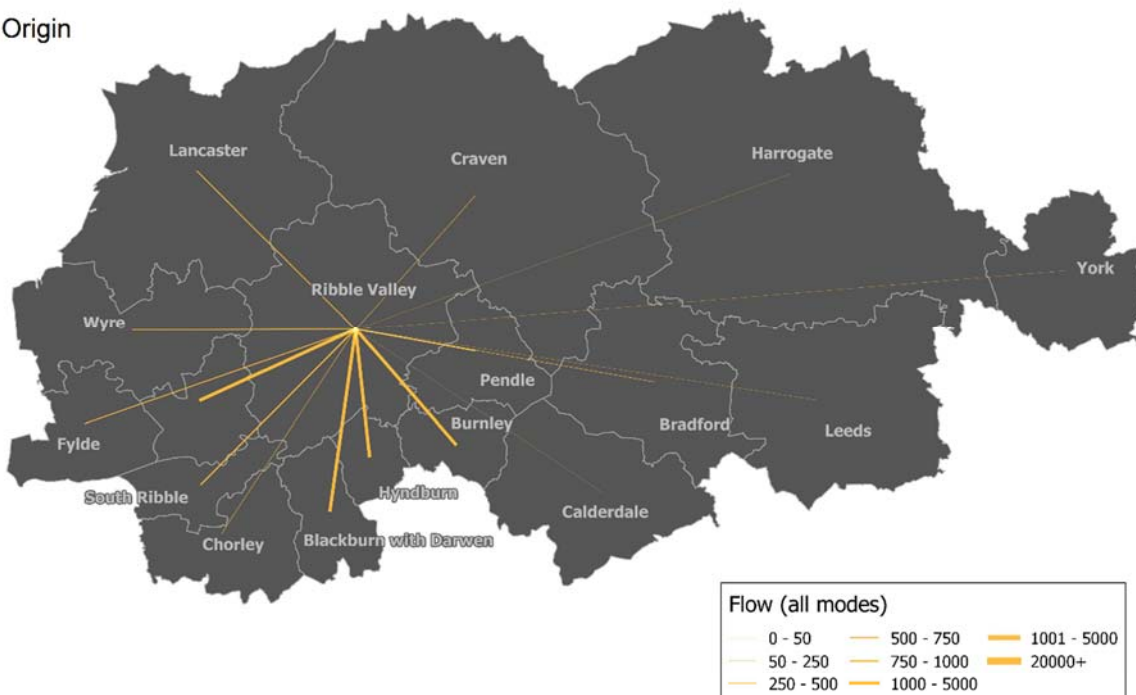


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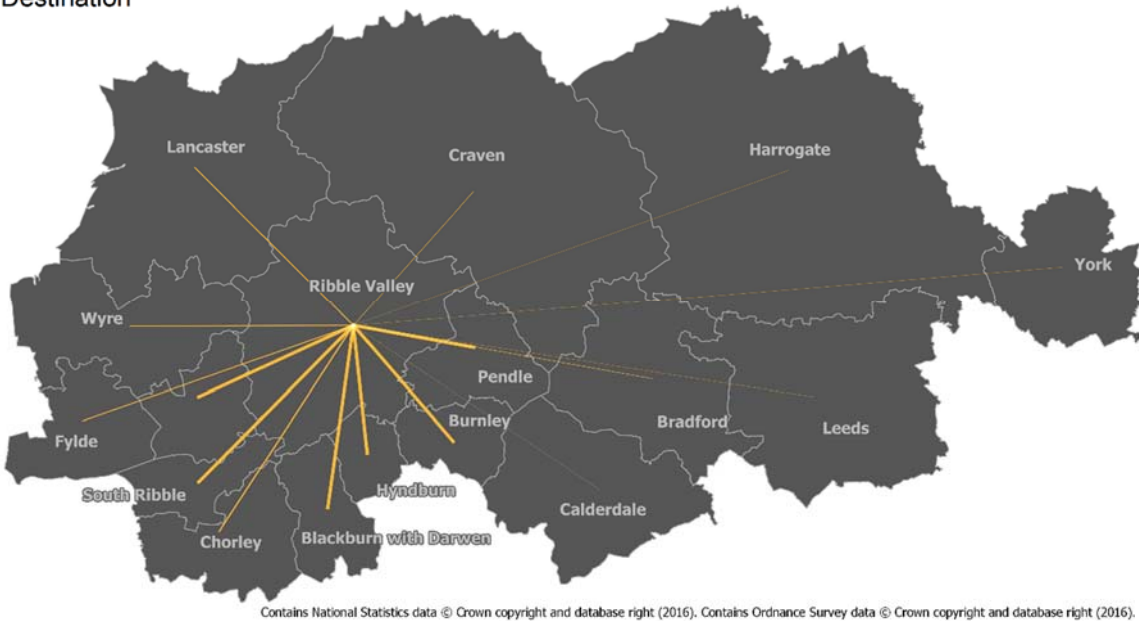
Figure 5.7 Flows to and from Preston for all modes

5.14 Those districts that lie at the Lancashire and Yorkshire border tend to show higher levels of cross Pennine labour movements. Nevertheless, Ribble Valley, in spite of its position on the county boundary, has very limited numbers of daily work trips to and from Yorkshire districts. In terms of inbound flows with over 50 journeys, there are 196 trips from Craven and 55 trips from Bradford. In the opposite direction over 50 trips are also made to Leeds. Burnley has a stronger relationship with Yorkshire and interacts with four Yorkshire districts at the over 50 trips level. Nevertheless, journeys to work within Lancashire predominate for both of these districts, shown in Figures 5.8 and 5.9.

Origin

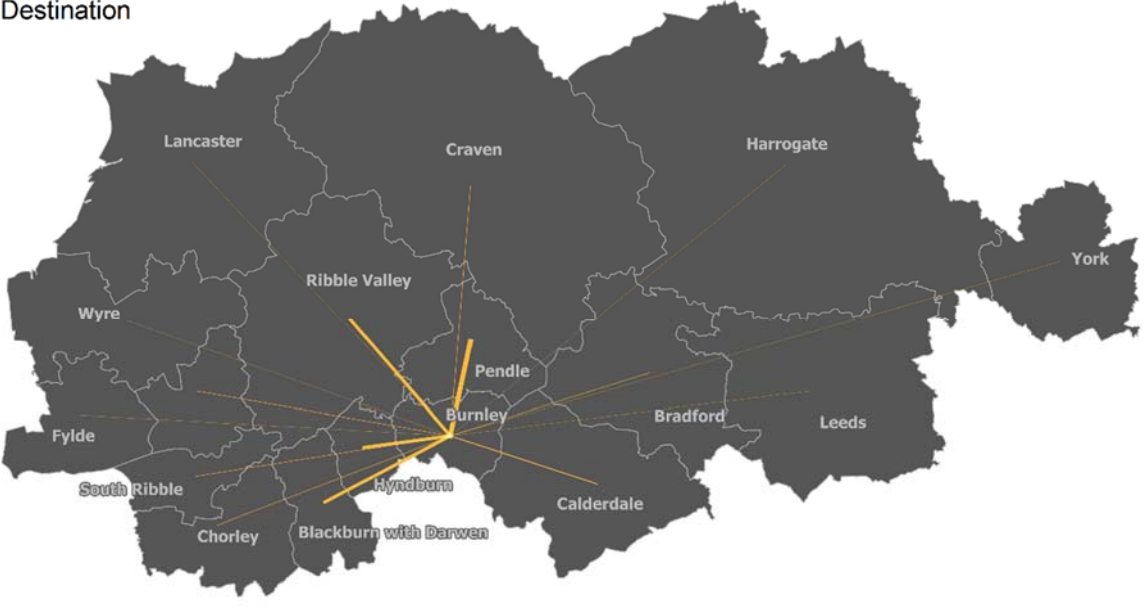
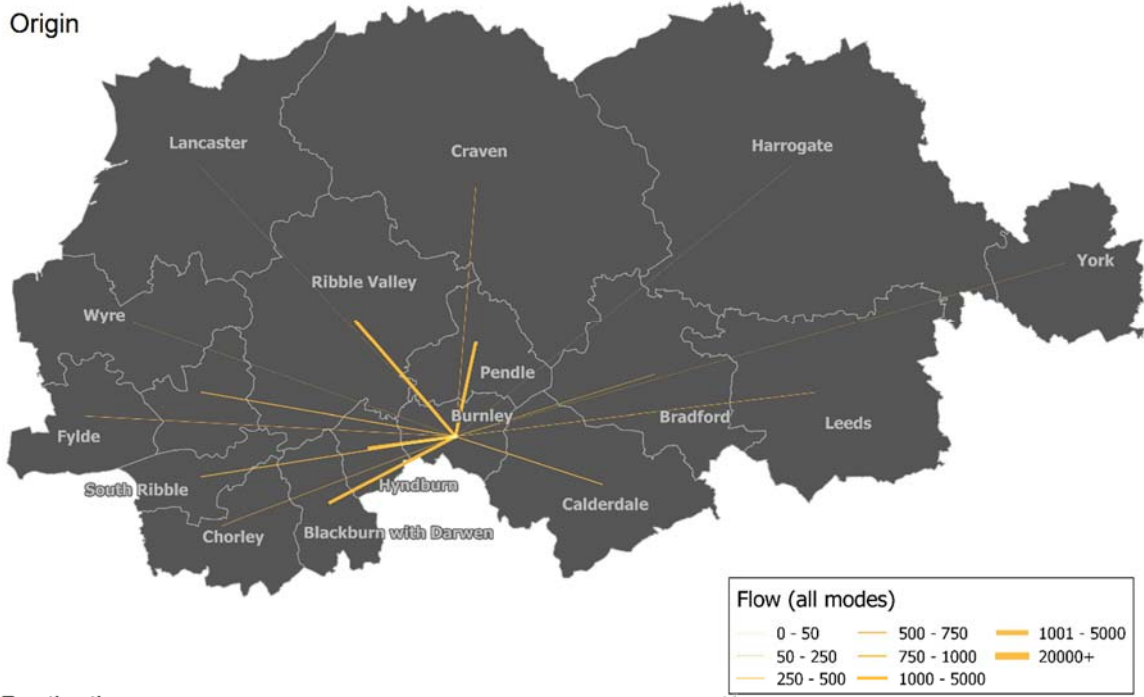


Destination



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Figure 5.8 Flows to and from Ribble Valley for all modes

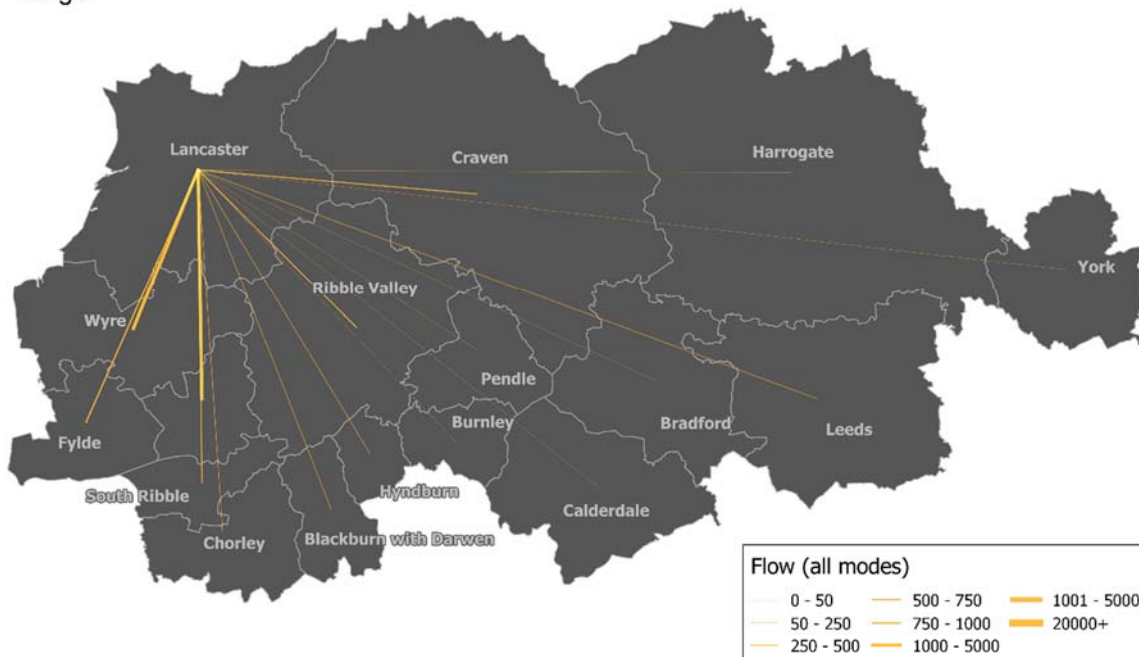


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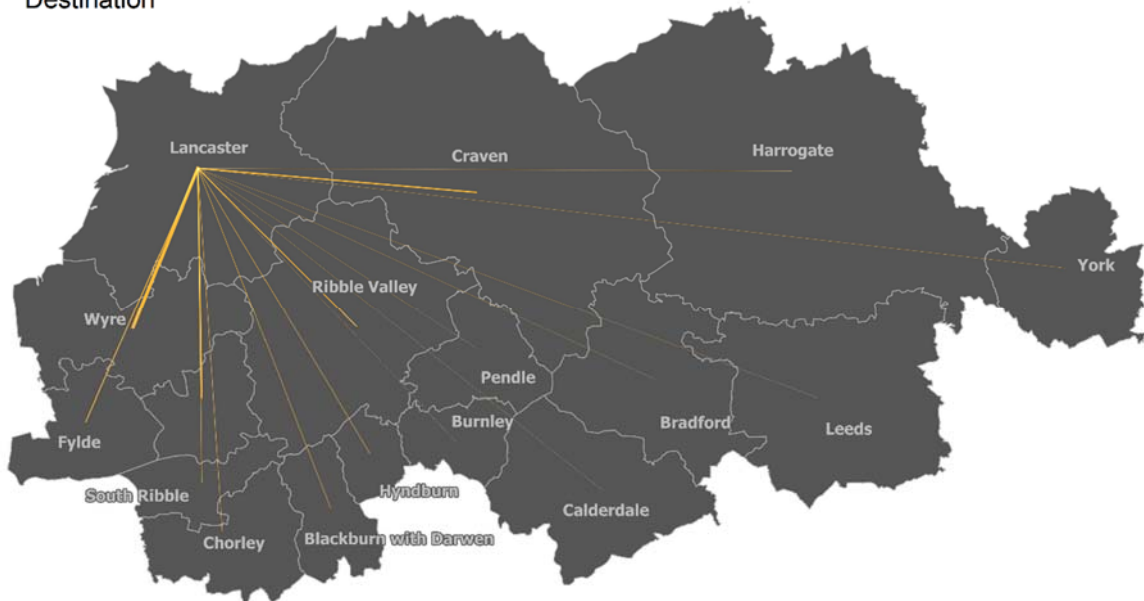
Figure 5.9 Flows to and from Burnley for all modes

5.15 Lancaster, which shares a border with Yorkshire to the northern end of the study area, nevertheless does not have as strong a relationship with Yorkshire in comparison to north-south flows to the other Lancashire districts. It only draws flows from Craven at the over 50 trips level (516 trips); and in the opposite direction there are 340 trips to Craven and 63 trips to Leeds. Figure 5.10 shows all flows to and from Lancaster for all modes.

Origin



Destination

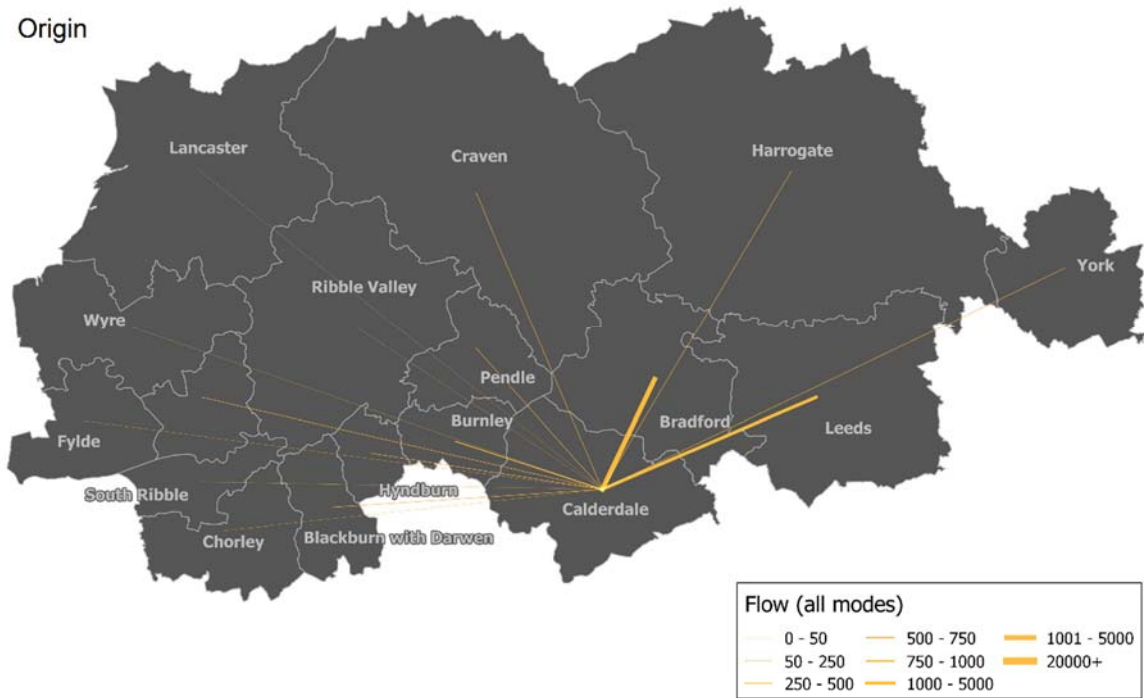


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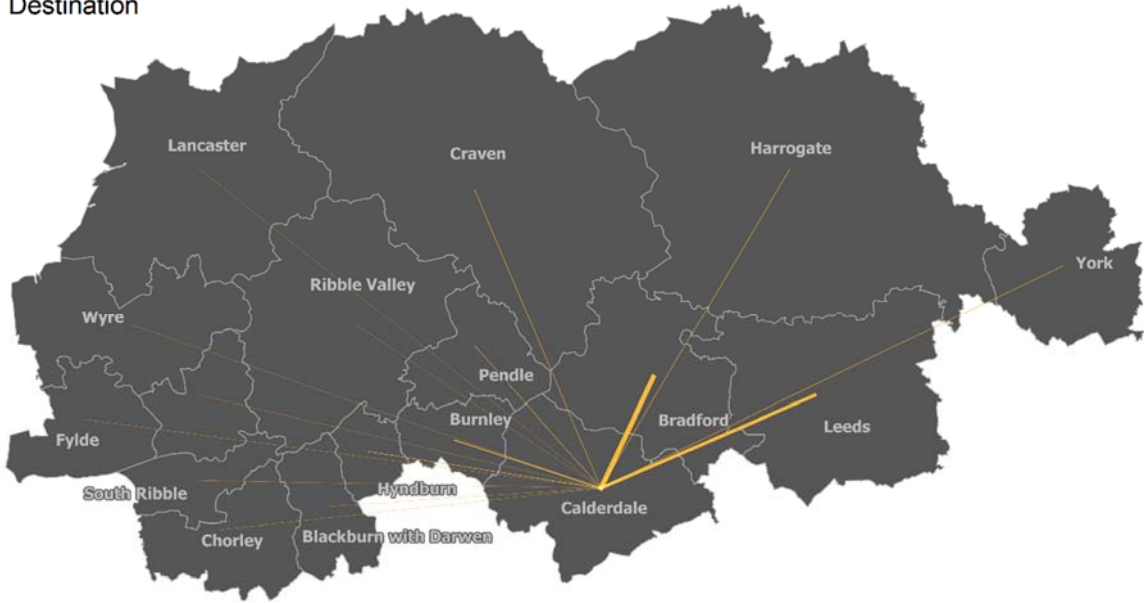
Figure 5.10 Flows to and from Lancaster for all modes

5.16 The largest number of significant movements across the Yorkshire and Lancashire border are to and from the border districts of Calderdale, Pendle and Craven. There are ten other districts with flows over 50 trips to and from Calderdale (half of which are in Lancashire). Overall 940 trips (7%) that originate in Calderdale end in Lancashire, predominantly to Burnley (419 trips). 645 trips that end in Calderdale (7%) originate in Lancashire. Pendle attracts 2,874 trips from the Yorkshire districts included in the analysis which equates to 23% of all of the trips from the study area ending in Pendle. Of those trips that originate in Pendle 1,196 (14%) of them end in Yorkshire. Finally, 1,695 (23%) of the trips that originate in Craven end in Lancashire whilst 2,597 (33%) travel in the opposite direction. These movements are predominantly to and from Pendle.

Origin



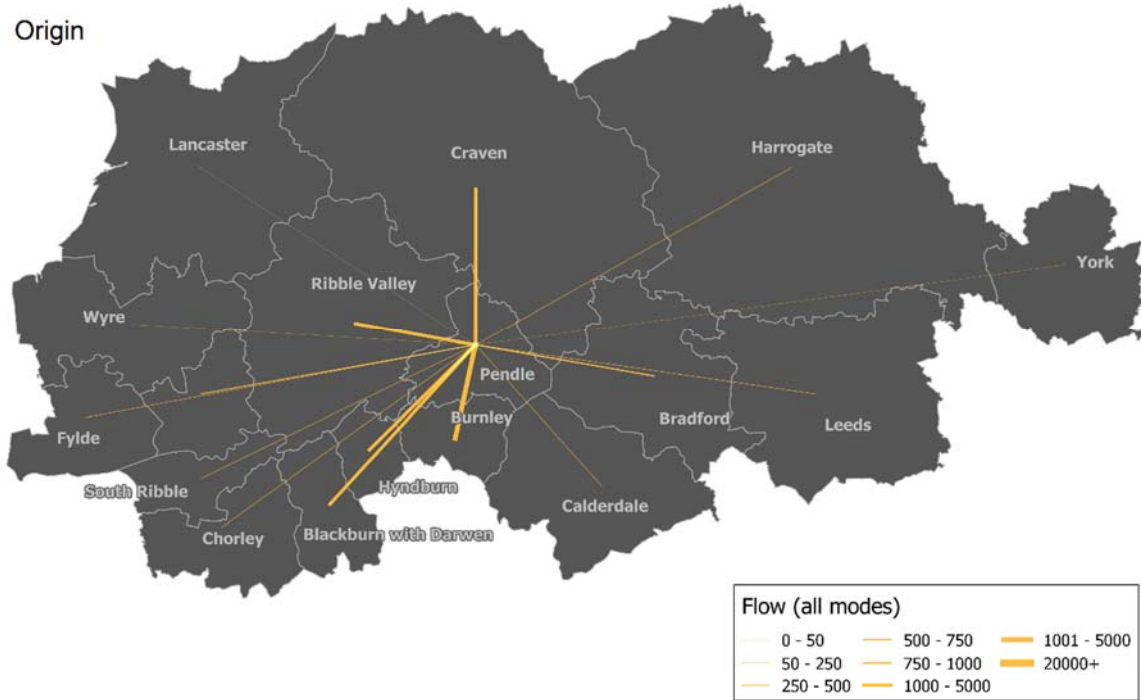
Destination



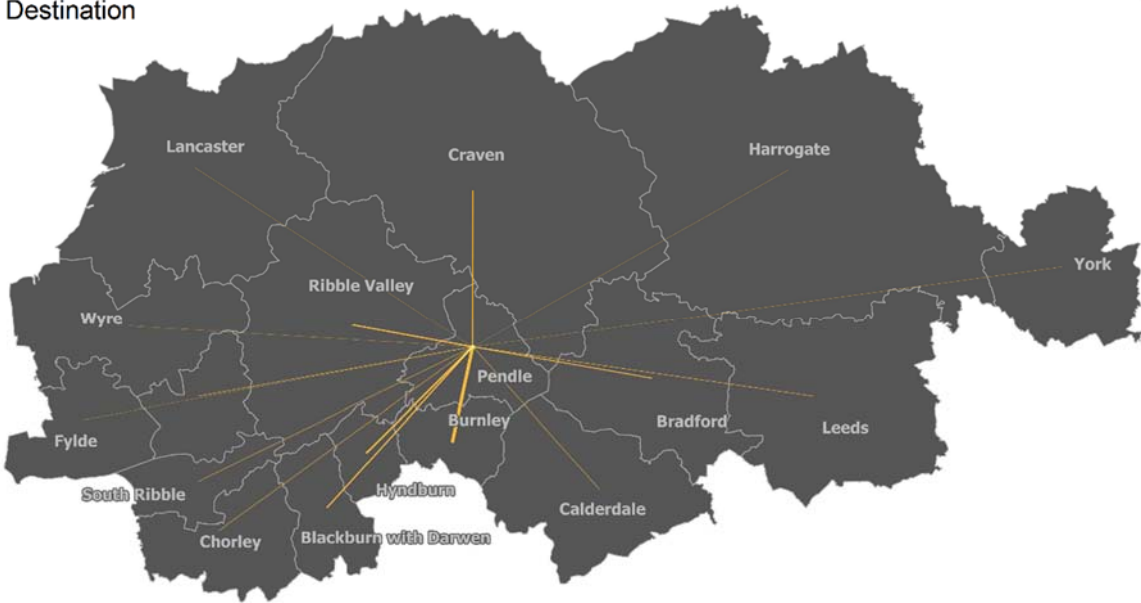
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Figure 5.11 Flows to and from Calderdale for all modes

Origin



Destination



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Figure 5.12 Flows to and from Pendle for all modes

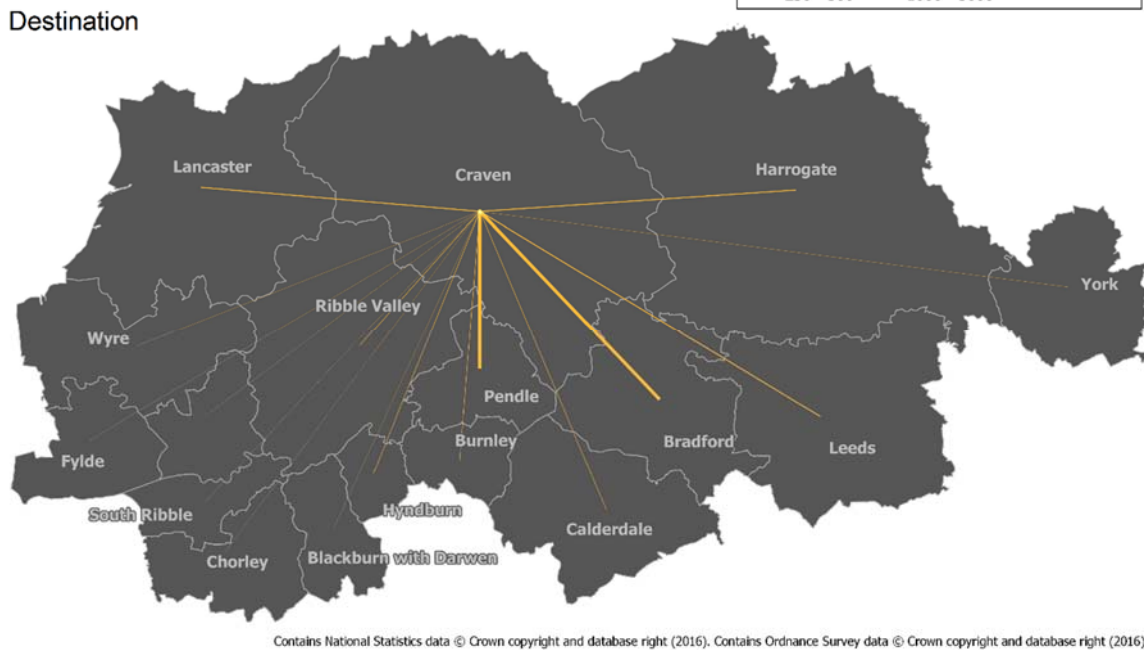
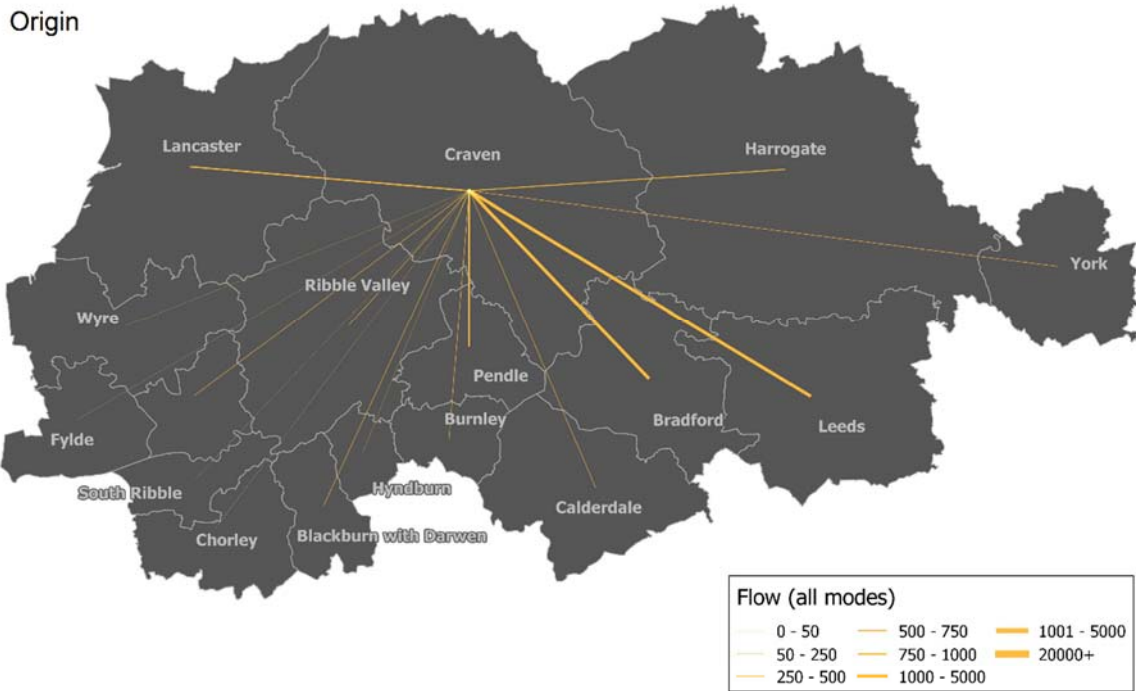
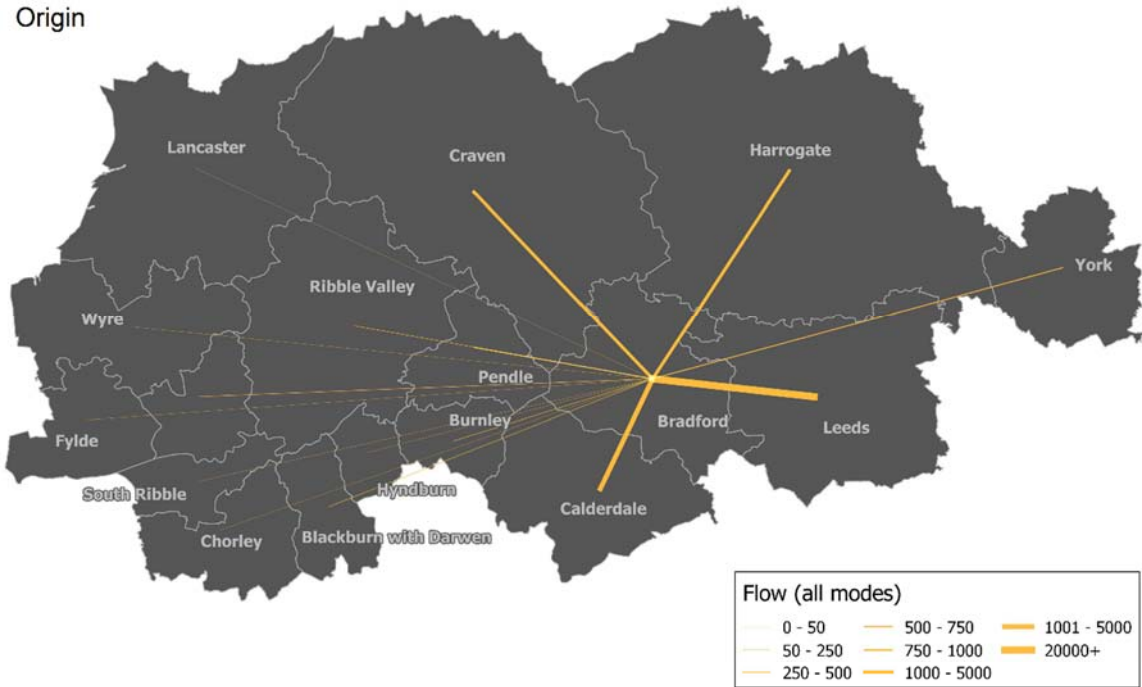


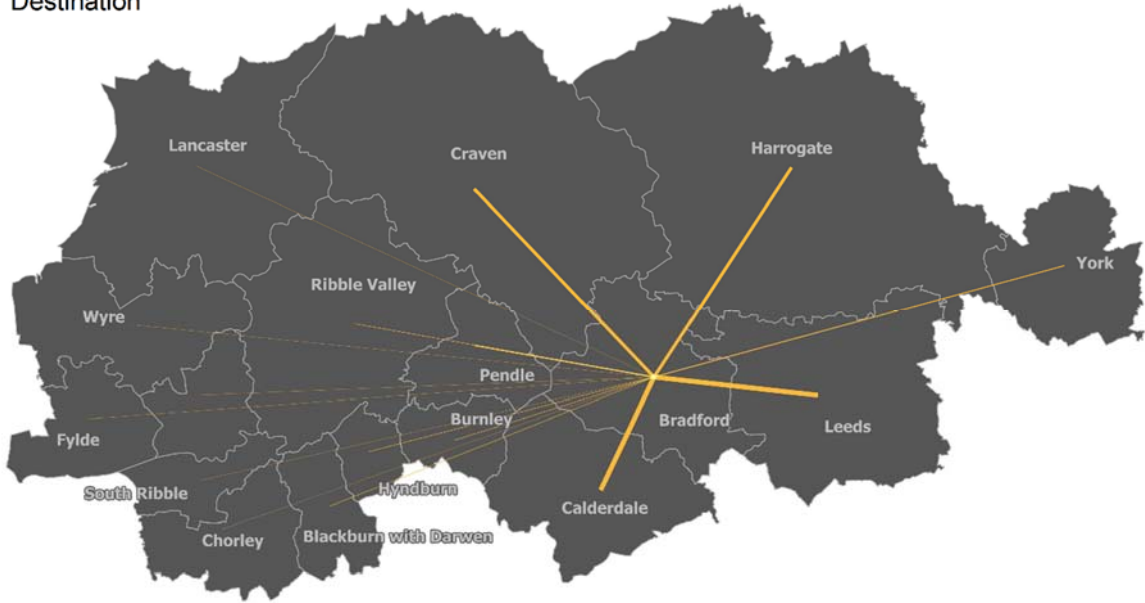
Figure 5.13 Flows to and from Craven for all modes

5.17 Finally, although many of the origin and destination relationships to and from Leeds and Bradford are dwarfed by journeys between the two, they do attract some trips from Lancashire. Bradford draws in 1,271 trips from Lancashire with 856 journeys in the opposite direction. Leeds attracts 833 journeys to work from Lancashire with 592 trips in the opposite direction. Flow maps for Bradford and Leeds are presented in Figures 5.14 and 5.15.

Origin



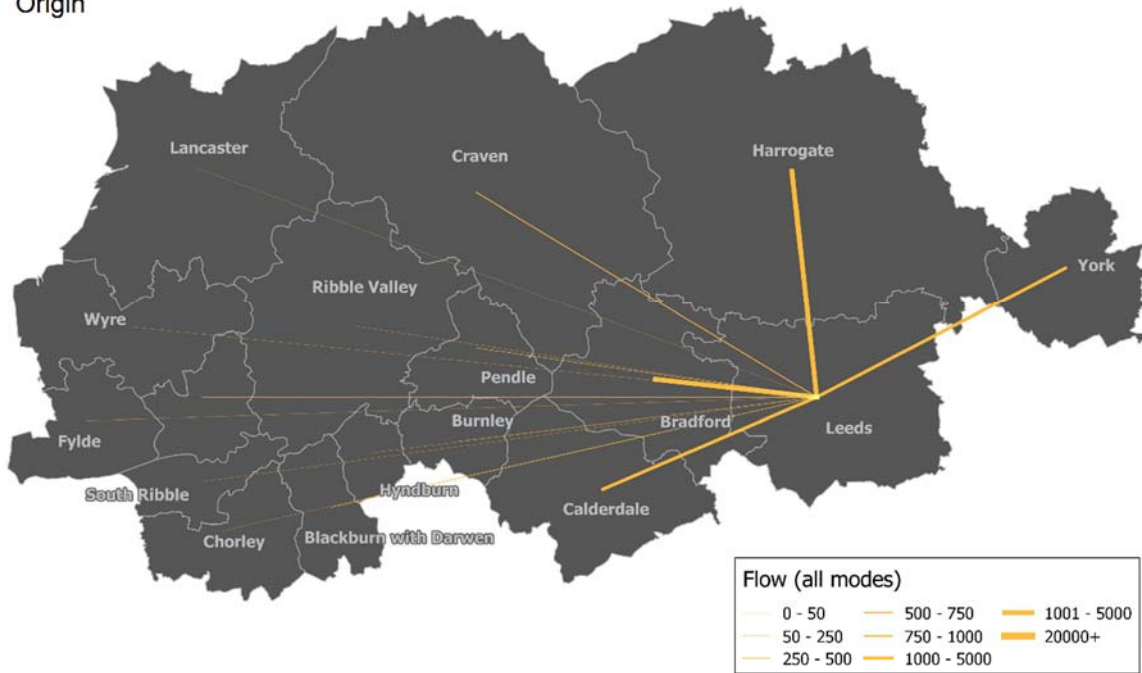
Destination



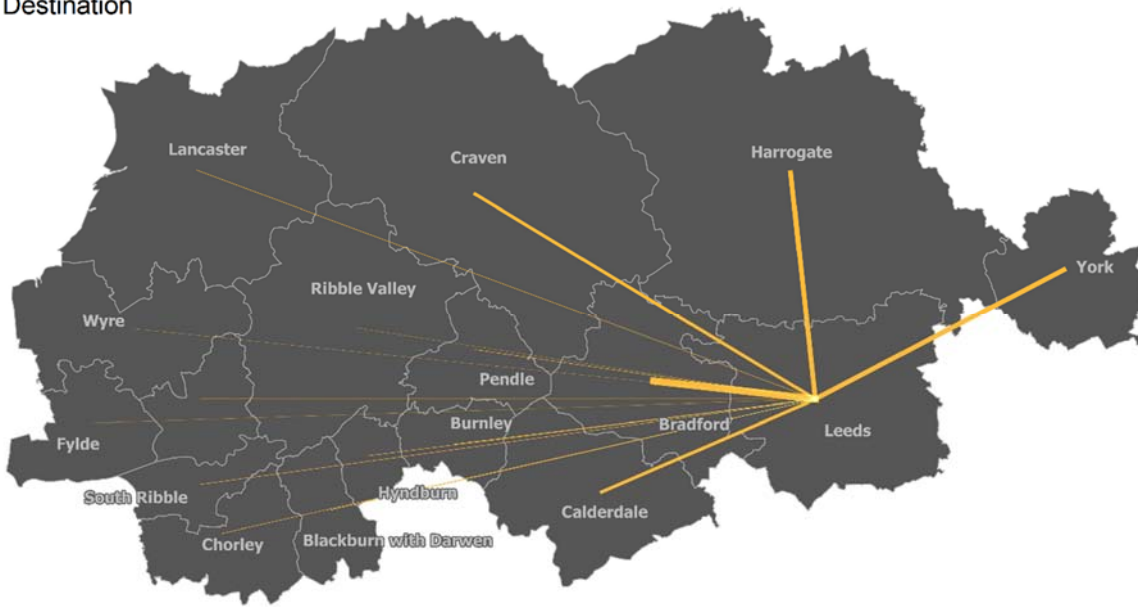
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Figure 5.14 Flows to and from Bradford for all modes

Origin



Destination



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Figure 5.15 Flows to and from Leeds for all modes

6.0 Overview of current major transport barriers and constraints

Introduction

- 6.1 Section 4 outlined the headline policy ambitions for the corridor, both in terms of the underlying economic rationale, and for transport and connectivity that supports local economies within the corridor, both east and west of the Pennines. The corridor does not, however, solely serve local communities. It forms part of the strategic network of the North, providing east-west connections within the wider northern transport system. Indeed, in this review of the transport barriers and constraints, it is worth reiterating the context of Transport for the North's (TfN) Northern Transport Strategy (2016), which outlines that east-west links, both in terms of road and rail movements, are a constraint on the northern economy. On road, TfN notes that *"the number, capacity, and reliability of east - west road connections are seen as a constraint on the Northern economy. The M62 is the only east-west motorway spanning the North and part of the EU designated trans-European network (T-TEN) linking Ireland to mainland Europe."* With respect to rail, TfN identifies that *"rail travel [enables] better access to employment and improving business-to-business connectivity. That is why the development of the Northern Powerhouse Rail network is a flagship of the Northern Transport Strategy. A network that brings the whole North closer together. Currently, this world-class network does not exist across the North."*
- 6.2 This section provides an overview of some of the more strategic transport barriers and constraints across the Corridor and is not intended to identify local 'pinch-points' and issues.

Road issues

- 6.3 In identifying existing physical transport constraints, the starting point west of the Pennines is the aforementioned East Lancashire Highways and Transport Masterplan, which highlights the following headline issues with respect to east – west highways linkages:
- Road links in this corridor tend to follow historic routes dictated by topography rather than travel demand. Many are poorly aligned and unsuitable for carrying large volumes of traffic, particularly heavy goods vehicles.
- 6.4 East of the Pennines the following key issue with east – west connectivity is identified:
- Journey time reliability issues on the A64 and A59. Summer time holiday traffic can, in particular, cause major delays, as can agricultural vehicles and slow moving heavy commercial vehicles.
- 6.5 Resilience is a major issue with current cross-Pennine routes such as the A59 and A65. The availability of suitable diversionary routes is therefore important, particularly for critical growth sectors such as the energy sector, which already has significance in North Yorkshire and the Humber. Resilience and continuity of supply and freight routes is critical, and the A59-M65-A6068-A65 corridor can play a part in providing this resilience.
- 6.6 There are a number of 'pinch point' resilience issues identified on the roads within the corridor, both east and west of the Pennines. Examination of a variety of sources such as the East Lancashire Highways and Transport Masterplan, M65 to Yorkshire Corridor Study, the Burnley/Pendle growth corridor studies, the North Yorkshire SEP, the North Yorkshire Strategic Transport Prospectus and LTP4, and the West Yorkshire Transport Strategy (2016-2036), illustrate these specific problems. These include:
- The M65 is not three lanes throughout its length, with reduced capacity on some sections, particularly between the M61 and Junction 6 at Whitebirk. Traffic has grown consistently by around 4% per annum since 1997, and evidence now suggests that the current level of demand

at peak times is causing congestion. There is some evidence to suggest that eastern sections of the M65 are relatively free flowing with delays at some but not all junctions in peak periods;

- The abrupt termination of the M65 at Colne inhibits east – west connectivity;
- The A6068 experiences the most severe problems when passing through the North Valley area of Colne, with traffic signal-controlled junctions and conflicting traffic movements interrupting the traffic flow resulting in congestion and delays throughout much of the day;
- Junctions 8 and 9 of the M65 have regionally significant employment locations, including Burnley Bridge Business Park and Network 65, which are likely to be allocated for further growth as major strategic employment sites. A number of the key employment sites on the M65 only have west facing slip roads and the majority of movements are west bound, acting as a constraint to connectivity eastwards;
- Congestion is a problem on the M65 as it reaches Preston in the peak hours;
- Landslip risk at Kex Gill on the A59 between Harrogate and Skipton. Indeed, this risk has been realised in recent months with a lengthy closure earlier in 2016;
- Congestion in Harrogate & Knaresborough on the A59 and in Malton & Norton further east of the A64 continues to be an issues in common with North Yorkshire's other main towns outside of this corridor;
- Similarly, in Calderdale the town centres (on or close to the A646) of Sowerby Bridge and Hebden Bridge suffer from major congestion, in addition to significant congestion hotspots on east-west routes to the east and south of Halifax, such as at Hipperholme Crossroads through to Stump Cross junction, and the A6026 and Copley Lane;
- Weight restrictions at Kirkby Stephen related to environmental constraints create issues for cross-Pennine movements;
- Major road improvement in Pennine areas is made difficult by the area's geography, topography and heritage considerations.

Rail issues

- 6.7 Rail links are also constrained by topography, with resulting low line speeds having a significant impact on journey times. Rail lines within the corridor are of a much lower quality than those further south that link Liverpool and Manchester with Leeds, Sheffield and the Humber ports.
- 6.8 The following east-west connectivity issues are identified in the Leeds City Region Metro study and WYCA's Rail Plan 7, part of West Yorkshire's Local Transport Plan 2011-2026:
- Peak period crowding at Leeds City Station, which affects people using every rail service into the city, including those within this corridor;
 - Connectivity issues on the Calder Valley route linking the hubs of Halifax, Bradford and Leeds due to poor journey times and inadequate service frequency. The electrification of this corridor is seen as a key strategic transport priority in the West Yorkshire Transport Strategy, and would improve Bradford's connections to the key destinations of Leeds, Manchester and Manchester Airport;
 - Ageing rolling stock on the Calder Valley corridor;
 - Although one of the best performing lines in West Yorkshire, the Airedale corridor between Leeds

and Skipton requires additional peak period commuter capacity. This would involve longer rolling stock and platform lengthening work;

6.9 The East Lancashire Rail Connectivity Study identified the following deficiencies in the local rail network:

- Issues on the local rail network include constrained connectivity due to poor linkages between services on the north-south (Clitheroe to Manchester) and east-west (Calder Valley) corridor. An interchange at Blackburn is required to link services on these lines;
- Service frequencies are low in East Lancashire. The majority of stations within East Lancashire are only served by an hourly service frequency, with only Preston, Blackburn and Accrington having a half hourly service;
- Journey times are slow. Car journey times are commonly quicker than rail journey times;
- Rail usage is as a consequence lower than might be expected from the area. The percentage of individuals travelling to work by train is lower in all ten Local Authority areas in the study area than the average for both the North West and England and Wales;
- There are poor rail links from east Lancashire to Yorkshire;

6.10 The subsequent opening of a Blackburn – Burnley – Manchester service may help provide improved connections to east-west services for some journeys.

Journey to work issues

6.11 There are also some geographically specific issues that emerge from the evidence base, including the data of current journey to work patterns:

- Lancaster currently has very limited east-west movements. This is largely a reflection of the physical landscape and topography, which has in turn historically led to poor transport routes;
- The Science and Innovation Audit identifies the potential for enhancing relationships between Lancashire and Sheffield. Current linkages to Sheffield are either via the M6 or other routes such as Woodhead and the Snake Pass which have clear resilience issues;
- Links to and from East Lancashire to Calderdale are poor, yet there are some signs of commuting.

7.0 Qualitative economic narrative for enhanced East-West connectivity

Introduction

- 7.1 Developing an evidence based economic narrative to support the case for enhanced East West connectivity is seen as being critical going forward to inform a wider case for investment. This section draws upon the existing evidence as well as the views of key stakeholders and our own analysis to inform an evidenced and justified qualitative narrative for enhanced connectivity. Whilst section 8 seeks to quantify the potential wider economic benefits (through an assessment of agglomeration and labour market/employment benefits of improved connectivity), this quantitative analysis does not capture a number of the other more qualitative economic drivers of the case for enhanced physical connectivity that are presented within this section.

Supporting complementary high growth, high value economic sectors and clusters

- 7.2 Across the Central Corridor and the three functional LEP areas more generally, there are a number of key complementary economic sectors which are considered to be either existing or likely future significant drivers of economic output and productivity. Identifying and understanding these sectors and sub-sectors and the extent to which there are commonalities (and existing inter-relationships) between different spatial and economic sub-areas is an important part of understanding the economic geography of the Corridor and a key part of the overall case for enhancing East-West connectivity. Agglomeration benefits relate to those associated with bringing businesses or workers in the same sectors/industries together and given that there are a number of similar and complementary industries and sectors across the Corridor economies, it is important to understand this further in establishing the potential for agglomeration benefits to arise through enhanced connectivity. There is a wide body of literature that points to not only the positive correlations between enhanced transport connectivity and increased levels of agglomeration but also the links between increased agglomeration and improved productivity and economic output.
- 7.3 Enhancing the potential for the increased agglomeration of business activity within and between these key existing and growth sectors through improved physical connectivity could improve overall economic output across the Central Corridor as well as promote increased innovation, supply chain development, knowledge transfer and overall operational efficiencies. The economic sectors where we consider there to be key commonalities/complementarities include the following:

1) Innovative/Advanced/High Value Manufacturing and Engineering

- 7.4 Of all sectors, it is evident that manufacturing, and particularly, advanced manufacturing, is the one which is not only already a significant contributor to economic output in all 3 functional economic LEP areas, but which is also a key priority for future growth across all 3 economic geographies. From the Central Lancashire District of South Ribble through to the East Lancashire Boroughs of Pendle and Burnley and the West and North Yorkshire Districts of Bradford, Leeds and Craven, manufacturing has been and remains a major driver of economic output and productivity.
- 7.5 Identified as one of the 4 'prime' capabilities within the IER, advanced manufacturing is clearly a pan-Northern strength and opportunity that is based on historic capabilities and competitive advantages as well the significant economic asset base that exists in the sector that is constantly evolving and progressing. The Central Trans-Pennine Corridor is home to global manufacturing assets that compete at international levels. These include not only leading multinational companies and Original Equipment Manufacturers (OEMs) such as Rolls Royce, BAE Systems and Leyland, but also leading SME supply chain businesses, HE institutions and innovation/R&D facilities, often with physical and

virtual links to other parts of the wider Northern advanced manufacturing ecosystem. Advanced manufacturing of one form or another (i.e. innovative manufacturing or advanced manufacturing) is an identified key economic priority within the Strategic Economic Plans of all 3 LEP areas and it is evident that it is a sector which is not only already a major contributor to economic growth and GVA, but one which has significant growth potential. Manufacturing is also being prioritised at a national level by Government, with an emerging national Industrial Strategy due to be published in 2017.

7.6 Across the Corridor there are various specific sub-sector strengths in different spatial locations. For example, in Central/East Lancashire, there is a strong focus on the aerospace and automotive sectors and this is largely founded upon the presence of the major employers in these sectors, of which selective companies have been identified above. However, there are a significant number of Tier 1 and Tier 2 and below supply chain businesses located across other parts of the Corridor, particularly towards East Lancashire and West Yorkshire which support these global businesses and some are in fact global businesses in their own right. An overview of some of the key sub-sectors within the advanced manufacturing sector is presented below:

i) Aerospace

7.7 According to a recent BIS Research Paper (July 2016), in 2015, the UK aerospace industry employed 116,000 people directly, and generated a revenue of nearly £29bn, £9.2bn of which was value-added revenue. Gross value added grew on average by 4% per annum between 2009 and 2015 (in real terms), compared with 2% for the manufacturing industry as a whole, and 1% for the UK economy overall¹². According to the North West Aerospace Alliance (NWAA), the North West aerospace cluster is the 4th largest globally, the largest in Europe and contributes over £7 billion to the UK economy, accounting for one quarter of the UK aerospace turnover.

7.8 The majority of the NW aerospace cluster is located in Lancashire and the Lancashire SEP reports that Lancashire has the single largest concentration of aerospace production in the UK, employing over 20,000 people. Major employers include global firms such as Rolls Royce, BAE Systems and Safran Nacelles. Safran Nacelles employs a workforce of around 750 people directly. It is one of the two main integrators of aircraft engine nacelle systems in the world and a major supplier to the Rolls Royce aerospace manufacturing operations in Barnoldswick, which directly employs c.1,300 people and draws its employees from across Lancashire, Yorkshire and beyond. The Rolls Royce operations at Barnoldswick manufacture fan blades for aircraft and it is understood that these are largely transported via road to the manufacturing HQ facility in Derby via Skipton and down to the M1. Adjacent to the Safran site is 'Innovation Drive', a rapidly expanding cluster of hi-tech supply chain businesses to the aerospace and automotive supply chains, including BCW Engineering, suppliers to business such as Aston Martin and Lotus and Kaman Tooling, a supplier to Tier 1 and Tier 2 businesses within the aerospace sector. There is also the West Craven Business Park at Earby – companies here are aerospace supply chain business to the Rolls Royce operations at Barnoldswick and this has attracted significant inward investment e.g. Curtis Wright. In the Pendle area around Nelson and Colne, there are also businesses which supply the aerospace and other manufacturing businesses in Preston and Manchester.

7.9 The NWAA has developed considerable technical expertise to support aerospace companies through the delivery of supply chain improvement programmes such as Aerospace Supply Chain Excellence (ASCE), Growing Autonomous Mission Management Applications (GAMMA) and the National Aerospace Technology Programme (NATEP) and the North West aerospace sector, of which Lancashire is a key driver, is performing very strongly.

¹² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/536903/bis-16-310-aerospace-supply-chain-study.pdf

- 7.10 Across the Pennines in West Yorkshire, there are also a number of major aerospace assets and employers. These include leading manufacturing supply chain businesses such as Klinger Ltd in Bradford, a world leader in the development, manufacture and distribution of quality sealing products to the aerospace and other sectors such as the oil/gas industry; Dytel Technologies Ltd, based in Leeds, which focuses on the design and manufacture of inspection equipment for the dimensional measurement of turbine blades and other aero engine parts used in the aerospace industry and PCC Airfoils based by Leeds Bradford Airport which manufactures complex castings for turbine engine applications used in commercial jet engines, military jet engines and helicopters. The University of Leeds is also reported to be ranked 4th in the UK for Aeronautical and Manufacturing Engineering. There are also a significant number of other leading precision engineering businesses supplying to the aerospace and automotive sectors based across West and North Yorkshire.
- 7.11 In South Yorkshire, as referenced within the SIA, there is a significant cluster of aerospace activity in the Sheffield/Rotherham area anchored around the Advanced Manufacturing Research Centre (AMRC), a High Value Manufacturing Catapult Centre. Boeing is a key partner in this, alongside the University of Sheffield, and other partners include Rolls Royce, BAE Systems, Airbus and Safran. With rapidly developing assets which now include the Rolls Royce Factory of the Future Building, the AMRC Composite Centre and the AMRC Factory 2050, there is a major cluster of Tier 1 and Tier 2 business activity in this area. This already has strong links to the aerospace sector in Lancashire through businesses such as BAE Systems and Rolls Royce and their supply chain businesses, and SIA vision for an Advanced Manufacturing Corridor. The development of a Northwest Advanced Manufacturing Research Centre at Samlesbury will only enhance this relationship and need for enhanced physical connectivity. In East Yorkshire, there are firms such as Gardner Aerospace, one of Europe's largest independent manufacturers of metallic aerospace detailed parts, headquartered in Derby, UK with a manufacturing base in Hull. In North Yorkshire, Kirkbymoorside is home to Marshall Aerospace and Defence Group, one of the UK's largest independent aerospace and defence companies which supplies components to OEMs such as Boeing, Airbus, BAE Systems, and Bombardier.
- 7.12 BAE Systems currently focuses its manufacturing activity on sites including Warton in Lancashire (a designated Enterprise Zone site) and Brough in East Yorkshire, Aircraft components are transported via at least two trucks per day from Brough to Warton where they are assembled, through BAE's logistics contract with Wincanton, the largest UK owned logistics provider nationally. Wincanton has recently completed phase 1 of the construction of a new Defence Logistics Centre on the Samlesbury Enterprise Zone site, which comprises 165,000 sqft of logistics floorspace and from where large aircraft will be transported nationally and internationally and significant components brought into via Wincanton's haulage fleet from across the UK. As identified within the IER, the 'Taranis' semi-autonomous Unmanned Aerial Vehicle (UAV) was also developed at Warton. Lancaster University has strengths in technology management, analysis of big data and is a partner in the Growing Autonomous Mission Management Applications (GAMMA) Programme. UCLan also has distinct engineering strengths and offers undergraduate and postgraduate courses in Aerospace Engineering, with an Engineering Innovation Centre under construction in Preston which will directly support the aerospace and wider engineering sectors.

ii) Automotive

- 7.13 According to the Northern Automotive Alliance (NAA), the North West automotive cluster directly generates some £9bn of the total UK automotive manufacturing economy which relates to approximately 12% of the UK total, placing it as the second most significant region for automotive manufacturing in the UK. Employment in the North West automotive cluster is currently estimated to

be approximately 16,200¹³. There are a number of global OEMs within the North, including Bentley, JLR, Nissan, General Motors and Leyland DAF (PACCAR). Whilst the majority of these are based in the North West, there are a significant number of supply chain businesses in this sector located across Lancashire, West and North Yorkshire and beyond. An example of is BorgWarner, a US owned global automotive business which has a major manufacturing site on the Euroway Industrial Estate in Bradford from where it supplies turbochargers to Leyland DAF (PACCAR) in Leyland, which assembles trucks and distributes them globally from Lancashire via road with a number understood to be exported from the Port of Hull on the east coast. Leyland DAF (PACCAR) also has a dedicated R&D facility on site.

- 7.14 The US engineering business, Cummins, has its global turbo technologies research and development headquarters in Huddersfield and again is closely integrated to supply chains across the North of England, supplying engines to Leyland DAF (PACCAR) in Central Lancashire. Sanko Gosei, manufacturer of component parts to the automotive sector is also based in Huddersfield, as are a number of other turbo charger businesses such as SCM Turbomotive, a distributor to Borgwarner. From an HE and R&D perspective, the University of Bradford is home to the Automotive Research Centre, whilst there is the Turbocharge Research Institute at the University of Huddersfield and the Universities of Leeds and UCLan in Preston also both have specialist leading automotive based research and teaching facilities and provision. West Yorkshire is also home to bus manufacturer Optare (based in Sherburn in Elmet) and Ginetta (racing car manufacturer) based in Leeds.
- 7.15 West Yorkshire has a number commonalities with Lancashire in terms of the automotive sector and both have an historic legacy in commercial vehicles and heavy diesel engine manufacturing. The North East region also has a strong automotive industry (largely being driven by Nissan in Sunderland) and there are linkages between the North East, Yorkshire and Lancashire in this sector, as there are with businesses located in South Yorkshire as well. The ambition for the sector is to attract additional Tier 1 supply chain businesses, many of which are internationally owned businesses, to the North of England and addressing current East-West connectivity issues is likely to be able to enhance its ability to do this.

iii) Advanced/technical textiles

- 7.16 The Alliance Project was established and commissioned by the Greater Manchester Combined Authority and Lord David Alliance to examine the potential for repatriating textiles manufacturing to the UK. According to its report published in 2015, the UK textile industry is worth £9 billion to the economy and is experiencing year-on-year export and domestic growth. The report identifies that in 2012, the textiles sector employed over 10,000 people in West Yorkshire (12% of Great Britain total), just under 8,000 in Greater Manchester (9% of national total) and 5,000 in Lancashire (6% of UK total). Together the combined area of West Yorkshire, Lancashire and Manchester accounts for around 23,000 workers, representing just over a quarter of the national textiles manufacturing workforce¹⁴. According to NW Texnet, the North West and Yorkshire are the leading national centres for textile manufacturing (as well as the East Midlands) and the UK is the 15th largest textile manufacturer globally.
- 7.17 The economies of West Yorkshire and Lancashire have historically developed on the back of the textile industries, with West Yorkshire leading the worsted/woollen sector and Lancashire being a leading cotton manufacturing location. In the mid-20th Century, increased competition from overseas

¹³ <http://northernautoalliance.com/about/nw-automotive-industry/>

¹⁴ <http://neweconomymanchester.com/media/1467/3234-j2747-alliance-project-report-lb-low-final.pdf>

and the invention and popularity of synthetics led to a relative decline in the industry. However, the sector across West Yorkshire and Lancashire is still strong and although reduced in capacity compared to what it was, is still highly skilled, highly innovative, technologically capable and focused on quality. There are a number of mills that continue to produce fabric and materials for a wide range of end uses from clothing/fashion through to healthcare and the automotive and aerospace sectors. Trends for shorter fashion manufacturing lead-in times and increasing overseas production costs as well as increased awareness of ethical issues have all assisted UK textile businesses.

7.18 The sector has progressed in many ways and there is an emerging 'technical/advanced textile' industry across the two LEP areas which is closely integrated to wider growth sectors with strong functional relationships. Allied Textiles is a good example of a Transpennine advanced textiles business. It is headquartered in Barnsley with company operations located in Rawtenstall (Coating Applications Group) and in Nelson (William Reed). Examples of other existing businesses in this technical textiles sector include:

- Parkhill Textiles (Burnley) - manufacturer of reinforcements for the composites industry and was the first UK company to manufacture zero crimp fabrics in the UK
- James Dewhurst Reinforcement Solutions (Altham) – global technical textile business with R&D facility
- Blackburn Yarn Dyers (Blackburn)
- Simon Jersey (Altham) – work uniform manufacturer
- William Reed Weaving (Nelson) – filament fabric manufacturer serving a range of industries
- Cloverbrook Fabrics Ltd (Burnley) – global performance fabric manufacturer
- THS Industrial Textiles (Elland) – leading industrial textile supplier
- Arville Textiles Ltd (Wetherby) – technical textiles manufacturer serving sectors such as automotive, aerospace and healthcare
- Mitchell Interflex Ltd (Colne) - weavers of fabrics for industry, furnishing, fashion, leisure, military

7.19 Huddersfield is also home to the Textile Centre of Excellence and the University of Leeds is strong in this sector, with a range of courses on offer. Burberry has also recently announced plans to develop a new global manufacturing HQ in Leeds City Centre as part of a wider City Centre regeneration scheme. It is evident that there are significant sector growth opportunities across the Corridor in this sector and that there a number of well-established and leading businesses with key economic relationships with businesses in wider growth sectors within the pan-LEP area including aerospace, automotive and healthcare.

Health/Med-tech/Life Sciences

7.20 Health Innovation is identified with the IER as a 'prime' capability and is also a key growth sector for all 3 LEPs as per their SEPs. With an ageing population nationally and the pace of technological change that we are experiencing, the need for increased R&D, innovation and the delivery of new products to the market is growing. The health innovation and life science sectors are nationally significant and whilst the leading clusters are around Cambridge/London, Manchester/Cheshire and Birmingham/Nottingham, there are considered to be major growth opportunities for further cluster development to respond to industry requirements. Existing current and proposed health innovation assets in the 3 LEP areas are presented below:

West and North Yorkshire

7.21 Key spatial areas of health innovation strength include Leeds, Bradford and York, although the sector is diverse both spatially and in terms of its offer. Current and prospective future assets and strengths within the LEP area include:

- Leeds NHS Teaching Hospital Trust, the largest NHS Trust in the UK and the largest teaching hospital in Europe (with the University of Leeds)
- Digital Health Enterprise Zone at the University of Bradford
- two market leading primary healthcare health IT systems (EMIS and TPP)
- the largest healthcare data platform in the world (NHS Spine)
- the NHS Health and Social Care Information Centre HQ (HSCIC) (LCR has the highest number of health informaticians in the UK through this)
- Leeds University is developing a new innovation centre focused on life sciences and health care
- Centres of excellence for medical research in Leeds, York, Huddersfield and Bradford Universities
- Home to some of the leading international medical manufacturing companies (Smith & Nephew, Covance, Surgical Innovations, DePuy International, RSL Steeper, Brandon Medical), with a particular reputation in the manufacture of orthopaedic devices, wound care, surgical instruments and medical equipment.

7.22 According to the Leeds LEP, the healthcare sector employs 196,000 people and is a sector forecast to grow significantly. There are 138 Centres of Excellence in healthcare across the Leeds City Region and it is home to 4 of the 5 NHS headquarters¹⁵.

Lancashire

7.23 The health sector in Lancashire is already a major employer and as identified within the SEP, activities range from high level research and medical product manufacture, through to employment in the NHS, and in a significant and growing health and social care workforce which is increasingly migrating from the public to private sector. According to the IER, it employs 61,000 people. Current and prospective future assets and strengths within the LEP area include:

- Lancashire Teaching Hospitals NHS Trust
- Lancaster Health Innovation Campus - Lancaster University, together with partners Lancaster City Council and Lancashire County Council, is developing a Health Innovation Campus on land currently allocated for a Science Park development and which adjoins the University. The Campus is a new knowledge based initiative on an 11ha site immediately adjacent to the University campus. At the heart of the Campus is the University's Faculty of Health & Medicine which will work with international healthcare providers and companies.
- Lancaster University Centre for Ageing Research
- UCLAN – offers health related course provision as well as the Lancashire Clinical Trials Unit, focusing on research in the treatment of patients with complex needs and the Health Research Methodology and Implementation Hub (HERMI).
- University of Cumbria Lancaster Campus – offers a wide range of healthcare related education courses including degree provision.

7.24 It is evident that there is a significant, established and rapidly expanding cluster of nationally significant health and life science related activity in the Leeds City Region, based around Leeds/Bradford but also including wider areas such as York. The sector is perhaps less significant to the west in Lancashire particularly in terms of current private sector activity. However, there is a strong HE focus

¹⁵ http://www.investleedscityregion.com/system/files/uploaded_files/Leeds%20City%20Region%20-%20Healthcare%20Factsheet.pdf

on healthcare innovation, particularly through Lancaster University but also UCLAN, which, for example, is opening a new medical school at its Burnley Campus. The proposed Lancaster Health Innovation Campus also has the potential to place Lancaster on the map in the health sector, with the potential to accommodate up to 2,000 new jobs and deliver new significant new R&D advancements in the health sector, particularly in relation to integrated approaches to the addressing the challenges of an ageing society. This could tie into existing and proposed initiatives in Yorkshire such as the Leeds Academic Health Partnership as well as other R&D activity and also facilities further afield such as the proposed Campus for Ageing and Vitality in Newcastle, a facility of national significance being developed with Newcastle University and the Newcastle Hospitals' NHS Foundation Trust. Newcastle City Council, working in conjunction with the University, has also recently secured planning permission for a new SME laboratory facility on the Science Central site targeting start-up and high growth life science businesses.

Digital

- 7.25 The Digital Sector is another IER prime capability, a key growth sector for the Leeds City Region and a 'developing sector' for Lancashire, which could also benefit from the agglomeration impacts of enhanced connectivity. The Leeds City Region, largely focused around Leeds and Bradford and the wider Airedale area, is developing a niche in this sector in areas such as gaming, big data, data analytics and financial technologies, linked to the strength of the financial services industry in Leeds and also Bradford/York/Skipton. According to the LEP, the sector employs c.70,000 people and contributes over £3bn of annual GVA¹⁶. The sector is closely aligned to other key sectors such as health (e.g. Health and Social Care Information Centre in Leeds) and professional services and there are very strong links between academia and business in the sector. Universities such as Bradford and Leeds Beckett offer nationally leading courses in highly innovative areas such as cyber security and the City Region is home to a number of leading digital agencies and technology businesses as well as the Leeds Institute for Data Analytics. Sky has a major presence in Leeds City Centre, which is home to its national technology hub. Leeds is also home to the only independent Internet Exchange Provider outside of London, meaning it has a highly resilient and secure infrastructure to attract digital businesses to the area.
- 7.26 Further to the north of the Corridor, Middlesbrough has a strong reputation in the digital sector with DigitalCity, lined to the academic strengths of Teesside University in this sector. Further north again is Sunderland Software City and there are particular digital strengths in Newcastle and Gateshead (e.g. VRTGO Labs – Europe's first centre of excellence for virtual reality). Whilst these are outside of the 'Corridor' there are nonetheless opportunities to enhance economic relationships with these 'centres of excellence' through improved east-west physical connectivity.
- 7.27 To the West in Lancashire, digital is a growing sector. Lancaster University provides Lancashire with a number of specific strengths in this sector, particularly in cyber security and big data. Businesses in Lancashire form part of the North West Cyber Security Cluster and there are plans to develop a Cyber Security Innovation Centre in conjunction with industry partners in Lancaster. Preston is home to firms such as Realtime UK, Xyone Cyber Security Services and a number of digital agencies. Again, the digital agenda also forms an important part of the wider health innovation plans that Lancaster University is at the forefront of delivering.
- 7.28 Despite the fact that digital technology advancements will be likely to continue to reduce the need for physical movements (e.g. through enhanced telecommunications and online interaction), there is likely to remain a critical need for businesses to still engage with other businesses, suppliers and customers

¹⁶ http://www.investleedscityregion.com/system/files/uploaded_files/Leeds%20City%20Region%20-%20Digital%20Factsheet_0.pdf

on a face to face basis as part of their operations.

Low carbon/energy

7.29 Energy is the final IER prime capability and combined with the low carbon sector and is a priority area of focus for all 3 LEP economies within the Corridor. The spatial focus varies, with more of a focus on nuclear and offshore wind in Lancashire, bio-renewables and offshore wind in North Yorkshire and low carbon energy generation and technologies in West Yorkshire, with more of a focus on the professional services end of the industry.

In Lancashire, energy is identified as a key growth sector within the SEP (which suggests that it already employs 37,000 people) and key energy sector assets and activities include the following:

- Port of Heysham - important UK offshore supply and servicing base
- Blackpool and Fylde College activities e.g. the Energy HQ on the Blackpool Airport EZ site (being developed) and the oil/gas sector training facilities
- Springfields Nuclear Plant (Preston) (includes the National Nuclear Laboratory)
- Offshore wind farms (e.g. Walney Island)
- Energy Lancaster – Lancaster University Research Institute
- Heysham 1 and 2 Nuclear Power Stations
- Future potential links to the Nuclear Advanced Manufacturing Research Centre (NAMRC) in Sheffield on the back of the recent SIA
- Potential shale gas opportunities

7.30 On the eastern side of the Pennines, energy is also a key growth opportunity focused around low carbon and environmental technologies. The LCR has a number of academic assets including the University of York's Biorenewables Development Centre and BioHub Innovation Centre proposals and the University of Leeds Centre for Low Carbon Future and Centre for Integrated Energy Research. It is home to Drax at Selby (biofuel power station responsible for generating 7% of the UK's electricity) and there are also plans for shale gas fracking at Kirby Misperton in North Yorkshire. On the East Coast, there are a number of major energy developments being progressed including the Able Marine Energy Park, Siemens' proposed investment at the Green Port Hull and major plans for offshore wind farms off the Humber into the North Sea.

7.31 This is a rapidly changing sector and one in which R&D and innovation is a key driver, with clear potential benefits of increased knowledge transfer and new technologies

Logistics/distribution

7.32 Identified within the IER as an 'enabling' capability, this sector is not seen a key priority growth sector within individual SEPs, but is clearly critical to supporting other sector growth objectives. There are a number of established logistics and distribution sites along key arterial road routes within the Corridor and these are important components of wider supply chain activities. The key 'hotspots' for this type of activity in the Corridor include sites adjacent to or within close proximity to the A1, M65, M6 and M606. With growing trends for last mile distribution to support e-commerce activity, there are also an increasing number of distribution hubs located on the fringes of the urban centres, not necessarily directly on these strategic road routes.

- 7.33 It is very difficult to understand and map sector supply chain movements in detail as selected routes will account for a wide range of factors and will change frequently to maximise the efficiency of operations. We have spoken to distribution businesses within the Corridor who suggested that each day their selected East-West routes may vary through the Corridor in response to particular congestion/resilience issues not only within the Corridor but also on strategic routes around it. If, for example, the M62 is heavily congested for whatever reason, it may be preferable to use an alternative route such as the M65, for example.
- 7.34 It is evident that there are a number of significant and strategic logistics operations and businesses located within the Corridor that are highly likely to use east-west routes. We are aware of anecdotal evidence that suggests that in some instances there is a focus on the M62 as the primary means of east-west movement for businesses that may be located some way north of the M62 Corridor itself, due to the challenges associated with navigating east-west on road routes north of this and particularly the lack of resilience if there is an incident of any form.
- 7.35 Whilst the M62 Corridor is and is likely to remain as the key east-west axis for logistics operators, there are a number of operators choosing to locate on the M65 Corridor as well, both around its junction with the M6 and further east. There are businesses such as Boohoo (major fashion retailer) located at Heasonford (1m sqft with over 1,000 employees), Exertis (500,000 sqft at Bamber Bridge, with over 800 employees), Waitrose (Northern Regional Distribution Centre at Leyland), Amazon (168,000 sqft distribution facility at the Lancashire Business Park in Leyland) and Express Gifts (located in Accrington with c.2,500 employees), Fagan & Whalley (distribution business located in Padiham) and Spar (Northern Distribution Centre at Preston East). The M65 Corridor is proving to be an attractive location for these types of occupier and there are a number of additional distribution and logistics sites planned for this area. Elsewhere across the Corridor, there are major logistics operations on routes such as the A1(M) (e.g. Potter Logistics and Wolseley, the world's largest trade distributor of plumbing and heating products, both of which are based on the edge of Ripon). There are also businesses such as M&S which has a 1m sqft distribution centre at Euroway Industrial Estate on the M606 in Bradford.
- 7.36 Whilst the M1/M62/M6 corridors are likely to remain as the location of choice for a number of the larger national logistics operators, there is a clear rationale as to why sites along the M65 will continue to be attractive to the market, particularly for mid-size units. Land costs are likely to be lower and with the growth of e-commerce and the requirement for next day deliveries and 'click and collect' deliveries, there is likely to be a continued growth in 'last mile distribution centres closer to urban conurbations to enable this. We are also seeing a move towards more parcel led delivery methods which require increased responsiveness and agility to respond to consumer needs.
- 7.37 With the significant presence of manufacturing businesses across the Corridor, these also generate the need for supply chain movements, often of large and bulky goods and components. The completed Defence Logistics Centre on the Samesbury Enterprise Zone site, which comprises 165,000 sqft of logistics floorspace, is a good example of a logistics facility being located adjacent to a major manufacturing facility and this will be operated by Wincanton, a national plc logistics business.
- 7.38 Enhancing east-west road connectivity would certainly increase the attractiveness of the Corridor as a whole to logistics providers and would enhance the operations of existing logistics businesses. With the continued growth of e-commerce, the sector is likely to continue expanding and connectivity improvements could enhance its ability to attract investment in this sector. The logistics sector will need to become increasingly agile and responsive to meet business and consumer needs and road connectivity and reliability will be key to this. Enhancing the Corridor's connectivity to key transport hubs such as ports and airports will also increase its ability to develop its logistics and distribution offer.

- 7.39 Rail freight has also been identified as an area for improvement and existing rail capacity issues are understood to be limiting the scope for rail freight. Increased rail freight opportunities could deliver positive impacts upon sectors such as the aggregates sector (large concentration of quarrying/aggregate businesses in North Yorkshire) as well as the energy sector and others. A good anecdotal example is Drax Power Station in North Yorkshire. This currently produces between 7-8% of the UK's electricity and approximately 50% of this is from biomass which is brought in via rail from either Immingham Port or the Port of Liverpool. It is critical for the Drax operations to have these options to provide resilience. Typically, circa 12 trains are required each day to Drax to provide the required biomass (1,700 tonnes of biomass per train). Trains coming from the Port of Liverpool route through either Manchester, Liverpool or Derbyshire depending on the time of day and route availability and are typically taking around 7 hours to reach Selby at an average speed of between 10-12mph, when it should take less than half this time. This is a result of passenger trains taking priority through track access arrangements but also the inefficiencies on the rail network itself in terms of the infrastructure. To develop further, rail freight needs efficient routes that are direct and which avoid conflict with passenger rail services. It also requires route availability (i.e. permitted axle weights), reasonable grade profile, loading gauges and permitted train lengths.
- 7.40 With the planned growth of the energy and construction sectors across the Corridor and beyond it is important to consider the extent to which there will be an increased need for rail freight movements going forward, to distribute materials and fuels accordingly. East-west freight movements could be important going forward in terms of meeting wider freight distribution needs. The National Rail Freight Strategy (DfT, 2016) refers to the rail freight industry generating £1.6 billion per year in productivity gains for UK businesses as well promoting reduced road congestion and environmental benefits. There could also be a move away from rail freight as a mechanism for only transporting heavy bulk materials to more of a focus on fast moving consumer goods (e.g. food/fashion) given the growth in e-commerce.

Food and drink

- 7.41 The food and drink sector is not identified within the IER as a prime or enabling capability but is considered to be a strong and well represented sector in terms of business and R&D activity across the Corridor. It may not offer the growth potential or GVA output delivery of other sectors but it is a major employer across the Corridor. It is one of six priority sectors for the Leeds City Region, is identified as a key existing sector for Lancashire and a key growth priority for North Yorkshire, particularly focused on agri-food/tech and the bioeconomy. Across the Corridor there is a very diverse food and drink sector, spanning supermarket HQs, major manufacturers and innovative bioscience businesses and assets. The rural nature of large parts of the Corridor means that agriculture and food production is an important part of the economy, particularly in North Yorkshire and Lancashire. There is also a growing focus on local product initiatives such as 'Made in Lancashire' and DeliciouslyYorkshire.
- 7.42 In Lancashire, as per its SEP, food manufacturing is a key sector with a workforce of over 13,000 (higher proportion than nationally), and is home to global brands including Dr Oetker and PepsiCo. Dr Oetker, for example, has its only UK manufacturing facility based in Leyland from where it manufactures frozen pizzas and then transports these to Yorkshire for frozen storage purposes prior to their distribution to retailers. It also has its UK Head Office and Commercial Centre at Thorpe Park Business Park to the east of Leeds City Centre. Its operations therefore necessitate east west movements. Other key food/drink businesses in Lancashire include Burton Biscuits (manufacturing facility and subsidiary office in Blackpool), Fox's Biscuits (manufacturing facilities in Blackpool and Batley, West Yorkshire), Warburtons (Burnley and Blackpool) and InBev brewery (Samlesbury). Preston is also home to the Booths Supermarket HQ. Booths has around 28 stores of which around

half are in Lancashire but also has stores in Cumbria, Yorkshire, Cheshire and Manchester and there is clear evidence of Booths utilising east-west routes across the Corridor to deliver goods to stores in locations such as Ilkley, Settle, Kirkby Lonsdale and Barrowford.

- 7.43 In North Yorkshire, the food sector is seen as a major growth opportunity. Sand Hutton near York is home to the National Agri-Food Innovation Campus which includes tenants such as Fera Science Ltd a joint venture between DEFRA and Capita, and a number of private sector organisations. The site is home to two National Centres for Agricultural Innovation and several public organisations. Further north in Leeming Bar there is a well-established food cluster of international importance. This includes the Leeming Bar Food Enterprise Centre as well as major businesses such as R&R Ice Cream plc (also have a base in Skelmersdale, Lancashire), Sarnia Food & Drink Manufacturing and ABP Food Group. Further to the east is McCain Foods with its global HQ in Scarborough and also the Malton Food Enterprise Zone and to the south is the Nestle facility in York (manufacturing and distribution) and the Sam Smiths and John Smiths breweries in Tadcaster.
- 7.44 The sector is also strong in West Yorkshire with businesses such as Arla Foods (Leeds) which also has a creamery facility in Settle, Coca Cola (Wakefield), Kerry Foods (Ossett) and a number of key national retailer HQs including Asda (Leeds) and Morrisons (Bradford).
- 7.45 The food and drink manufacturing sector is one which employs a high number of people and which has trans-Pennine relationships and movements, the vast majority of which are likely to result in large bulky movements via road, a number of which are likely to go to ports for exporting overseas. The sector's labour supply is also supported by a number of Eastern European workers which could be impacted by the recent Brexit vote subject to the actual implications of this. Enhanced physical connectivity could improve labour market resilience through making employment opportunities more accessible and attractive to existing and prospective skilled workers.

Unlocking the skills, R&D and innovation potential of the Corridor economy

- 7.46 The Corridor is home to 9 Higher Education Institutions (HEIs) including a number which are ranked globally as leading institutions in particular taught and research areas. The Universities of York and Leeds form part of the 24 research-intensive, world-class universities that make up the Russell Group. However, all of the other universities also have particular strengths in different areas. The University of Lancaster is now in the 'top 10' in the UK in the major 3 UK university league tables and is highly regarded for the quality of its research. Together with others such as UCLAN and Leeds, it is highly regarded in the field of advanced engineering. A number of these universities are already working together in specialist areas, collaborating with businesses and other organisations to develop new technologies and solutions to the current and future needs of society across all identified priority growth sectors. This cutting edge R&D and its collaboration with business is critical to the Corridor's economy and provides it with a major USP. The Universities are also working internationally with other businesses and academic institutions and their potential ability to contribute further to economic growth is significant.
- 7.47 The N8 Research Partnership is a collaboration of the eight most research intensive Universities in the North of England and includes Leeds, Durham, Lancaster, York, Liverpool, Manchester, Newcastle and Sheffield Universities. Its aim is to promote increased University collaboration in research and it is focusing at present on a number of research themes including agrifood and urban/community transformation. These Universities want to work with not only each other but also the 'best businesses' regardless of administrative boundaries.
- 7.48 It would appear wholly logical to suggest that if there was improved connectivity within the Corridor that there could be increased opportunities for collaboration not only between the universities on either

side of the Pennines (including facilities “in the middle” such as the UCLAN Burnley Campus which is expanding) but also increased opportunities for University-business collaboration and for the Universities to work more closely with the FE sector, particularly in areas where there is no physical HE presence. Enhanced connectivity could therefore also increase the attractiveness and accessibility of higher level skills development to learners which may have otherwise not been willing/able to consider skills development opportunities. It could enhance HE recruitment potential and also seek to address the ‘brain drain’ issues that many of the norther HE institutions face through enhancing graduate retention rates through improved access to employment opportunities.

- 7.49 We engaged with Lancaster University as part of this work, which suggested that whilst it has strong relationships with the N8 Universities and others within the Corridor, it could be doing more with the likes of Leeds, York and Bradford Universities and that the poor physical links across the Pennines are undoubtedly a factor in this. Lancaster University is a partner in the Round 2 SIA with York University linked to the Bioeconomy.
- 7.50 A key component and driver of the recent Lancashire/SCR SIA was the two Universities (Sheffield and Lancaster) and the existing connectivity issues between the two cities were also identified by Lancaster University as a potential barrier to maximising the impact of the ambitions for an Advanced Manufacturing Corridor.
- 7.51 A number of key innovation and R&D assets have already been identified in previous sections of this report, a number of which are associated with HEIs. The success of these is wholly reliant upon academic-business engagement/collaboration, knowledge transfer and the commercialisation of intellectual property at local, sub-regional, national and international scales and connectivity is key to supporting this through bringing the business and academic communities closer together.

Supporting the growth potential of other key transport hubs

- 7.52 Enhanced road and rail connectivity could deliver significant benefits to other modes of transport and established transport hubs within the Corridor and the wider North of England, including the following:
- **Leeds Bradford International Airport (LBIA)** – LBIA is a major economic asset for the Leeds City Region and wider North of England economy, with around 3.5m passengers per annum and employs c.2,500 people directly on site. The ambition is for this to double to 7m by 2030 and this is not considered unrealistic, with the airport seeking to deliver this before then. There are significant opportunities for it to develop its offer for leisure and business passengers and also to develop its air freight capabilities. A key challenge for the Airport is its surface access given that it has no rail link and the road infrastructure and connectivity is below adequate for an airport of this scale and ambition. Whilst the airport is exploring enhanced access solutions within its immediate vicinity, there is a clear case for more generally improving east west connectivity to enhance the airport’s accessibility and catchment area. At present there are high levels of leakage to other regional airports, particularly Manchester and East Midlands and this is due to the more limited routes on offer at LBIA. In order to attract additional airlines and routes to grow the airport as a key asset of city regional importance, there is a need to ensure that people (and possibly freight) can access the airport as part of its wider ‘sell’ to the airlines. Enhancing the ability for people living and working to the west and into Lancashire would be a key benefit to the growth of this regional economic asset. If the ambitions for expanding freight operations are also progressed then this could also benefit significantly from enhanced connectivity to the west.

LBIA is also seeking to develop a c.40 hectare commercial employment hub on land adjacent to the airport. This could comprise a mix of airport and non-airport related business activity and is seeking to mirror the success of similar strategic sites adjacent to airports elsewhere as well as to capitalise on the lack of employment land in this part of the City Region. Clearly, the success

of this commercial hub could also be enhanced as a result of improved east west connectivity to increase its connectivity with other business locations and also areas of workforce residence.

- **Manchester Airport** – enhanced east west connectivity could also support the growth of Manchester Airport. As the 3rd largest airport in the UK in terms of passenger numbers with over 23m passengers per annum, it directly employs more than 19,000 people directly employed on site, supporting a further 42,500 jobs in the North West of England¹⁷. Whilst it is not located directly within this Corridor, users of the airport travel along Corridor routes to access it for both leisure and business purposes. Currently, connectivity to the airport via road and rail from parts of East Lancashire and North Yorkshire particularly, is poor and enhanced east west connectivity could assist to improve routes across the Pennines to enhance ease of access to the airport and the efficiency of travel, particularly from a business user perspective.
- **Leeds, Preston and York Rail Stations** – all existing major rail hub stations with proposals for major expansion and connectivity enhancement at Leeds and Preston as proposed HS2 station hubs.
- **Port of Heysham and other East/West coast ports (e.g. Liverpool, Hull, Immingham, Teesport).**

The Port of Heysham is owned by Peel Ports and is located in close proximity to the M6 Motorway approximately half way along the west coast of mainland Britain. It is advantageous in that it is not tidal dependent. The Heysham Link Road/Bay Gateway has recently opened and the Port now has direct access via a new 4.8km dual carriageway straight to Junction 34 of the M6. Via Seatruck, the Port currently provides freight/cargo trips to and from Northern (Warrenpoint) and Southern Ireland (Dublin) and automotive/energy based freight forms a key component of the freight traffic. Whilst the origins/destinations of the cargo are likely to be varied, it is inevitable that it travels to/from Heysham via the M6. East west routes at this point are very limited and there is no easy east west route for HGVs. The port's main activity is container traffic going to and from Ireland. Most traffic goes straight onto the M6 and heads either North or South – very little goes east from Lancaster. It is very difficult to go east and has to go North or South (i.e. up to Carlisle north on the M6 and onto the A69/A66 or down to the M60 and onto the M62). With the new link road, the Port has an opportunity to capitalise upon this to further develop its offer, although the current limited east west connectivity prohibits this to an extent where cargo needs to travel in an east west direction.

Outside of the Corridor there are much more significant ports in locations such as Hull, Grimsby, Immingham and Liverpool, all of which could also benefit significantly from enhanced east west connectivity in this Corridor. The likelihood is that these ports rely on the M62 for road related east west movements, however this may not always be the most direct route and clearly there are resilience issues with having to rely on this single route. Improved east west road connectivity to the north of the M62 Corridor could therefore provide a complementary transport solution for cargo going to and from these ports and this could also release capacity on the M62 itself. Further afield, Teesport, the 3rd largest port in the UK, is also an important location for imports and exports and goods using this originating from or destined for locations in Lancashire or towards North Manchester may be reliant upon movements through the Corridor. East-West rail freight connectivity could also be important to unlocking the growth aspirations of the ports and to supporting wider economic growth ambitions.

¹⁷ <http://www.manchesterairport.co.uk/about-us/media-centre/fact-sheets/airport-summary/>

Supporting the needs and expansion of existing major employers and their supply chains

- 7.53 The sector analysis above has already identified that the Corridor is not only home to a number of key growth sectors but that there are also a number of major businesses and employers within the Corridor responsible for significant levels of employment and economic output. Some of these include, for example:
- Rolls Royce (Barnoldswick)
 - Leyland DAF (PACCAR) (Leyland)
 - BAE Systems (Samblesbury/Warton)
 - Silentnight (Barnoldswick – national HQ)
 - Skipton Building Society (Skipton - national HQ)
 - Asda (Leeds- national HQ)
 - Morrisons (Bradford - national HQ)
 - Boohoo (Burnley – national HQ)
 - Jet 2 (Leeds – national HQ)
 - Pace (Arris Group) – (Saltaire – national HQ)
- 7.54 These businesses and others of a similar scale are critical to the Northern economy, not only due to their direct employment and output but the wider supply chains that they create and support. These supply chains in key sectors are key to the future economic growth of the Northern economy and it is considered that increased mobility and connectivity across the North will be a key driver of the success of these supply chains and wider economic growth prospects.
- 7.55 Some parts of the Corridor are very reliant on one or two major employers and the impacts of them downsizing or relocating would be significant. For example, in some of the East Lancashire districts, there is a significant agglomeration of supply chain companies within the aerospace sector. These supply chains are often dependent upon Tier 1 and Tier 2 companies and the OEMs that these supply and the importance of ensuring that the Tier 1/2 businesses and OEMs remain committed to the area is paramount to local economic growth and sustainability. For example, in the Pendle-Burnley area (e.g. Innovation Drive – 40 acre established employment site), a number of aerospace supply chain businesses are located here solely due to their proximity to Tier 1/Tier2/OEMs as Safran Nacelles and Rolls Royce to whom they supply either directly indirectly. In the case of the automotive sector, for example, many of the larger businesses that have a presence in the Corridor are foreign owned. With the uncertainty of what Brexit could mean for these businesses and wider global competition within the industry (particularly from lower cost base locations), there is a need to ensure that the local and regional physical infrastructure that these businesses require to meet their operational needs is adequate, otherwise this could be another push factor in favour of relocations to other locations globally.
- 7.56 With increasing globalisation and overseas competition across a number of sectors, businesses are under significant pressure to enhance the efficiency of their supply chain operations. Supporting the needs of businesses and their supply chains to safeguard existing activity as well as supporting future investment/expansion activity is therefore critical particularly given the scale of operations in sectors such as aerospace and automotive and others in this Corridor.

Attracting new high value business activity and inward investment to the Corridor and wider Northern Region

- 7.57 In addition to retaining and safeguarding existing business activity and output, there is also a case for investment to enhance east west connectivity from the perspective of attracting new businesses and inward investment to the Corridor and the wider Northern region. The quality and provision of transport infrastructure is likely to be a factor accounted for by inward investors when assessing the merits of location options as this can impact upon both labour supply and supply chain operations as well as the accessibility of the location to other company locations across the UK and internationally (access to airports is likely to be an important part of this). Cushman & Wakefield recently undertook a location analysis for a US based pharmaceutical business exploring site options in the Leeds and Manchester areas for a new HQ office and manufacturing facility. We were asked to compare the offer of both city regions against a wide range of criteria including proximity to relevant University assets and existing pharma clusters but one of the main criteria for the business was proximity and accessibility to an international airport to enable ease of access for its US based management team. This is just one example of where connectivity plays a key role in inward investment decision making.
- 7.58 Businesses, particularly larger Tier 1/2 businesses will want to locate close to their supply chains and/or clusters of similar activity as well as to relevant R&D/skills/training facilities and to skilled workforces. Strong connectivity is therefore critical to ensuring that these facilities are accessible from a wide range of locations, to maximise the potential for inward investment opportunities.
- 7.59 In the context of inward investment, a key driver of economic growth and additionality, it is important to consider how an area's infrastructure compares and competes with other locations that may have otherwise similar 'pull' factors. It is likely that if an area is able to offer a resilient, agile, responsive and 21st Century transport system that meets industry needs and responds to changing travel and logistics behaviours and trends, this is more likely to set an area apart from one which has a backward and dated network that suffers from resilience and reliability issues which results in less agglomeration and more dispersed supply chains. Looking ahead and being visionary to be able to provide a transport system for the future is therefore an important consideration in this regard to provide the Corridor with a competitive advantage over other areas nationally and internationally when competing for new occupiers and inward investment.
- 7.60 Place marketing and the promotion of wider quality of life is also an integral component of securing inward investment. Ultimately, the decision makers who may be relocating to the new business location will want to ensure that there are attractive places in which to live and enjoy either adjacent to or within a reasonable commuting distance of the inward investment location. This is important to attracting and retaining the right calibre of staff and some inward investors will place more of an emphasis on this than others. However, if it can be demonstrated that through good transport links there are desirable locations in which people enjoy a high quality of life within a distance perceived to be commutable, this can be a key locational selling point. The physical and economic characteristics and diversity of the Central Trans-Pennine Corridor and the largely rural nature of large expanses of land, means that there are many attractive locations with a high quality of life, which are seen as desirable places to live. The key to maximising the 'sell' to inward investors is to be able to demonstrate that these places are accessible to centres of business and economic activity and this supports the rationale for enhancing connectivity to achieve this. Promoting accessibility to high quality cultural, leisure and visitor economy assets will also be important as part of this. For example, the Corridor is home to a number of designated national parks, areas of outstanding natural beauty and coastlines with a number of highly popular coastal resorts such as Blackpool, Scarborough and Whitby which are key economic drivers in their own right. Ensuring that people can access these assets efficiently via road/rail will enhance the attractiveness of the Corridor and assist to drive levels of visits and associated net additional expenditure from both residents within the Corridor and those further afield.

Supporting housing and employment growth proposals and requirements

- 7.61 Transport infrastructure is an ‘enabler’ and a catalyst as well being a means of getting from A to B. By this, we mean that it cannot only directly address an immediate highways related capacity or resilience issue, but it can also be a major catalyst for wider economic growth in its own right. The Central Trans-Pennine Corridor as a whole is likely to experience significant population growth over the medium term in line with wider UK projections and policy objectives, as defined within the Housing & Planning Act 2016 and the 2017 Housing White Paper “Fixing our Broken Housing Market”. For example, Leeds is the fastest growing UK City¹⁸ and over the medium term, the entire Corridor area is likely to experience net growth in terms of population. Local authorities are planning for significant population growth through their Local Plans and as part of this are allocating areas of land for specific end uses to meet projected need, based on the evidence base that exists. It is not only important that there are sufficient new homes and jobs to meet the needs of a growing population, but also that people can physically access employment opportunities. Ensuring there is a transport network in place that enables people to access jobs and skills/training from the new homes is key to the promotion of sustainable economic growth. Clearly, with increasing populations there will be more people movements and it needs to be ensured that there is sufficient capacity in the networks to accommodate these increased flows.
- 7.62 As already stated above, transport infrastructure can be an enabling investment. This means that the delivery of transport infrastructure can directly unlock housing and employment land for development. This in itself is an important consideration given the requirement for additional housing and employment land and floorspace and means that through, for example, interventions to enhance east west connectivity, this could directly unlock sites for development and therefore maximise the economic benefits of the infrastructure investment and the case for investment.
- 7.63 An overview of some of the key housing growth areas within the Corridor is presented below to illustrate the scale and extent of housing being proposed. The 3 SEPs have ambitions to deliver over 100,000 new homes within the next 10 years.
- The Preston, South Ribble and Lancashire City Deal aims to deliver over 17,000 new homes over the next 10 years.
 - The Leeds Local Plan Core Strategy (adopted) identifies the need for c.70,000 new homes over the next 16 years
 - Bradford Local Plan Core Strategy (draft) (40,000 new homes over the next 15 years)
 - South Lancaster Urban Extension (c.3,000 new homes)
 - Blackburn Housing Zone (850 new homes over the next 10 years)
 - Significant housing growth around Harrogate and for new ‘Garden Town/Villages’ around Flaxby/Hammerton
 - Housing growth around York, again with a Garden Town proposal at Whinthorpe to the south of York and proposals for over 2,000 new homes on the York Central Enterprise Zone site
 - Skipton has around 2,500 new homes allocated in the current local plan;
 - Significant housing growth is planned in Pendle with 5,660 new homes required by 2030. The majority of these will be in the Barrowford/Colne area.
- 7.64 As with many other parts of the country, it is evident that major housing growth is planned across the Corridor. Some of these developments will be reliant upon new transport investment to unlock specific sites, particularly given the scale of the proposals. For example, we are aware that the York Central site will require a major transport investment to unlock this, as will the proposed urban

¹⁸ <http://www.leeds.gov.uk/Business/Pages/Leeds-economy.aspx>

extensions/Garden Towns, given the scale of new development proposed. There will also be a need to provide an enhanced transport network to ensure that the new residents can access employment/skills opportunities and other services. Congestion is already identified as an issue on a number of road and rail routes within the Corridor and the additional housing numbers proposed are only going to put further pressure on existing congestion hotspots within the network. This alone supports a more general case for investment in transport infrastructure within the Corridor.

7.65 There are also a number of major existing and proposed strategic employment sites across the Corridor, some of which are of national and international significance, particularly the designated Enterprise Zone (EZ) sites. An overview of these is presented below, again to support the strategic case for improved transport connectivity to support their delivery prospects and to maximise their economic impact. There are 18 EZ sites across the 3 LEP areas, of which 14 are broadly located within or adjacent to the defined Corridor boundary. These include the below (see the EZ site plan in figure 7.1):

- 4 EZs in Lancashire:
 - Hillhouse – 138 ha former ICI chemical site located at Thornton Cleveleys, with a number of occupiers already on site. Focus on chemicals, advanced manufacturing and energy/low carbon
 - Blackpool Airport – 144 ha site - focus on energy, advanced manufacturing and food/drink manufacturing
 - Warton/Samlesbury EZ sites – 125 ha in total – focus on aerospace linked to BAE activity as well as automotive and other advanced manufacturing activity
- 2 EZs in West Yorkshire
 - Leeds/Aire Valley EZ – 4 sites totaling 138 ha. Focus on advanced manufacturing and logistics
 - M62 Corridor EZ – 9 sites totaling c.93ha. Focus on advanced manufacturing and logistics
- 1 EZ in North Yorkshire – York Central – 72 ha. Focus on office based development with supporting ancillary uses. (Note there is also a Food EZ in Malton).

7.66 There are clearly a number of complementary target sectors across the EZ sites and with the 100% business rate income retention benefits to the LEPs as well as the occupier incentives on offer through business rate discounts, there is a clear case for promoting development on these sites as a priority. The vast majority of the EZ sites are focused on the advanced manufacturing sector in some way or another and given that they have already attracted and are likely to continue to attract large national and global manufacturing occupiers, there are likely to be increasing synergies between the EZs across the Corridor which could necessitate physical movements between the sites and other key employment locations which could support wider cluster development within key sectors and industries.

7.67 There are also a wide range of additional existing and proposed major strategic employment sites across the Corridor, some of which are presented below by way of examples. A number of these sites are specifically focused on key growth sectors aligned to IER priorities such as advanced manufacturing, health and digital.

- Frontier Park (Blackburn)
- Network 65 (Burnley)
- Burnley Bridge (Burnley)
- Lomeshaye Business Park
- Barrowford Business Park
- Innovation Drive (Burnley)
- Whitebirk (Hyndburn)

- South Skipton Employment Zone (Skipton)
- Flaxby (Harrogate)
- Olympia Park (Selby)
- Briarfield Mill, Burnley
- Cuerden (South Ribble)
- Altham Business Park (Accrington)
- Junction 7 Business Park (Hyndburn)
- Huncoat (Hyndburn)
- Whitewalls Industrial Estate (Colne)
- West Craven Business Park (Earby)
- Crows Nest Industrial Estate (Barnoldswick)
- Euroway Industrial Estate (Bradford)
- Thorpe Park (Leeds)
- Kirkstall Forge (Leeds)

7.68 In addition to these, there is significant commercial development planned in some of the urban centres including for example, in Leeds City Centre (e.g. South Bank proposals to double the size of the existing City Centre) and in Bradford (plans for the redevelopment of 6ha of land/buildings within the City Centre for office and other commercial uses). As with the housing sites, a number of these sites will be dependent upon improved transport infrastructure to be deliverable. On others, enhanced transport connectivity is likely to be a key determinant of scheme viability and deliverability, based on the accepted premise that better connected sites are likely to be more attractive to occupiers and therefore drive higher demand and property/land values as a result. Land value uplift is becoming an increasingly important metric for determining the value for money of transport investment from a public sector perspective and there is evidence that can demonstrate the positive impact that transport investments can have on land and property values.

7.69 It is essential that these existing and proposed employment sites are supported with the necessary transport infrastructure to maximise their potential. It has already been identified that a number of businesses in the Corridor rely on east west movements as part of their business operations and with such significant growth planned, the emphasis on east west movement is only likely to increase. It is also recognised that many of the proposed strategic housing and employment sites are located on the either side of the Corridor (i.e. around Leeds/Bradford/York/Harrogate and Preston/Lancaster). This is particularly evident when one assesses the locations of the strategically important Enterprise Zone sites – these are all located on the fringes of the Corridor, as illustrated in Figure 7.1 below. This therefore raises an immediate question around the extent to which people are going to be able to access the significant employment opportunities that these sites will provide, particularly those that reside in the areas of greatest socio-economic need in the heart of the Corridor in East Lancashire. A spokesperson for Sky in Leeds recently reported to the press the challenges they have in recruiting the levels of staff they require for a range of job types and skill levels. At the same time, there are a high number of people in East Lancashire that are out of work, perhaps as a result of not being able to access suitable employment opportunities.

Figure 7.1: Plan of EZ sites within the 'Central' Trans-Pennine Corridor



**note – this excludes M62 Corridor EZ sites around Huddersfield (Lindley Moor East and West) and two EZ sites to the south of the Wakefield District as these are located outside of the Corridor. Also note, the Leeds Enterprise Zone comprises 4 adjacent sites.*

Addressing socio-economic inequalities

- 7.70 It is evident that there are a number of socio-economic disparities across the Corridor with some pockets of relative deprivation in locations across East Lancashire and within the larger urban centres particularly. Parts of East Lancashire (e.g. Burnley, Pendle, Blackburn) and West Yorkshire (e.g. Bradford) represent some of the most deprived communities nationally, based on the 2015 Index of Multiple Deprivation (IMD). On the whole, wage levels and output per worker is below national averages and there is a need to drive economic growth and productivity and address specific issues in relation to unemployment and skills and ‘gaps’ in employability. A key theme across the Corridor is the need to address the mismatch between the supply and demand for skills within key growth sectors. There is also evidence, both anecdotally and through the travel to work flow analysis, of very self-contained labour and housing markets and limited travel to work ‘horizons’ in parts of the Corridor, particularly across East and Central Lancashire. This is reported to be due to a combination of generational perceptions and the lack of connectivity/accessibility as a result of the physical topography, with the two considered to be intrinsically linked.
- 7.71 Enhanced East-West connectivity (in terms of journey times, cost and resilience) across the Corridor would assist to address the identified socio-economic inequalities and disparities and to enable people to be able to access economic opportunities across the geography of the Corridor. It would enable increased cross boundary/cross county flows and movements and would provide increases opportunities to better connect people to employment and skills/learning (i.e. access to further education and qualification attainment in key IER sectors etc) and maximise the potential of the Corridor’s economic asset and business base. There is no doubt that the current physical connectivity issues on an East-West basis are restricting the horizons of people, particularly from a travel to work and business to business perspective. Given the relatively small point to point distances between key locations within the Corridor, the transport connectivity issue should not be as significant as it is and needs to be addressed if the economic potential of the Corridor and wider Northern Powerhouse economy is to be fully realised and the productivity gap with the rest of the UK closed, as per the ambitions of TfN and each of the LEPs.

8.0 Quantitative economic benefits of enhanced east-west connectivity

Introduction

- 8.1 A wider economic impacts model for the study area has been developed by SYSTRA, in order to assist in understanding the potential quantitative impacts on the wider economy that improvements to east – west connectivity could promote.
- 8.2 The model has been developed following the principles and approaches set out by the Department for Transport in its WebTAG (Unit A2.1 Wider Impacts). The modelling work examines two key areas of potential benefit:
- Firstly “agglomeration” benefits – the benefits of businesses being located closer together and the associated increases in productivity that arise from this; and,
 - Secondly the “employment” effects, which look at the benefits to the labour market of improvements in connectivity where employers and employees can be better matched increasing productivity and better matching skills. In turn this brings additional employees into the system who may not previously have been in work.
- 8.3 The work examines a range of scenarios for the future development of the transport network to try and understand where the greatest levels of benefit exist across the study area. The remainder of this chapter sets out the approach taken to modelling in more detail, a description of the scenarios tested, and the presentation and interpretation of the results.

Defining & Modelling Wider Economic Impacts

- 8.4 Within conventional transport appraisal there is a focus on the transport user benefits, for example journey time and vehicle operating cost savings. Traditionally these form the bulk of benefits arising from transport investment schemes. However in recent years there has been a growing interest in the impact of transport investment on the wider “real” economy. There are a number of potential sources of benefit to the real economy arising from transport investments. However the main ones, and the focus of modelling work within this study, are the following:
- Agglomeration Impacts
 - Employment impacts

Agglomeration Economies

- 8.5 At their broadest level, agglomeration economies occur when individuals benefit from being “near” to other individuals, and exist when the spatial concentration of economic activity gives rise to increasing returns in production. Transport and communications play a crucial role because, in most contexts, speed and low costs in transportation and communication provide a direct substitute for physical proximity¹⁹.
- 8.6 Recent research²⁰ identifies where improved rail connectivity between places of different size may provide economic benefits. The obvious example in UK terms is the difference between London and provincial cities where better connectivity will enable the smaller centre to become “a more attractive

¹⁹ Daniel Graham & Patricia Melo, *Advice on the Assessment of Wider Economic Impacts: a report for HS2*, March 2010

²⁰ Bridget Rosewell (Volterra Partners) and Tony Venables (University of Oxford) *High Speed Rail, Transport Investment and Economic Impact*, 2013

location; it starts off with lower wages and rents, and improved connectivity means that it will get better access to London's large economic market and large base of suppliers".

Employment Impacts

- 8.7 An improvement in accessibility, for example through a reduction in generalised travel costs, is equivalent to an increase in the effective return to labour and capital. In relation to the effective return to labour, this may change outcomes in the following ways²¹:
- Better job matching as travel to work areas expand;
 - Changes in the number of working hours; or,
 - Reduction in inactivity as people enter the labour market.
- 8.8 In the case of changes to the returns to capital this could also change a firm's demand for labour in the following ways:
- Increased demand for labour as firms seek to expand production; or,
 - Reduced demand for labour as firms strive to achieve cost efficiencies.

Modelling Agglomeration and Employment Impacts

- 8.9 The approach taken to modelling these impacts utilises the approach set out by the Department for Transport (DfT) within its WebTAG. This is currently contained within Unit A2-1 Wider Impacts. However, this guidance is likely to be superseded by a new suite of WebTAG Units, which at the time of writing are the subject of consultation. Nevertheless, the details of the quantitative approach is consistent across the two sets of guidance.
- 8.10 The DfT guidance also provides data on employment and GDP at a local authority level, both important inputs into the modelling undertaken.

Study Specific Methodology

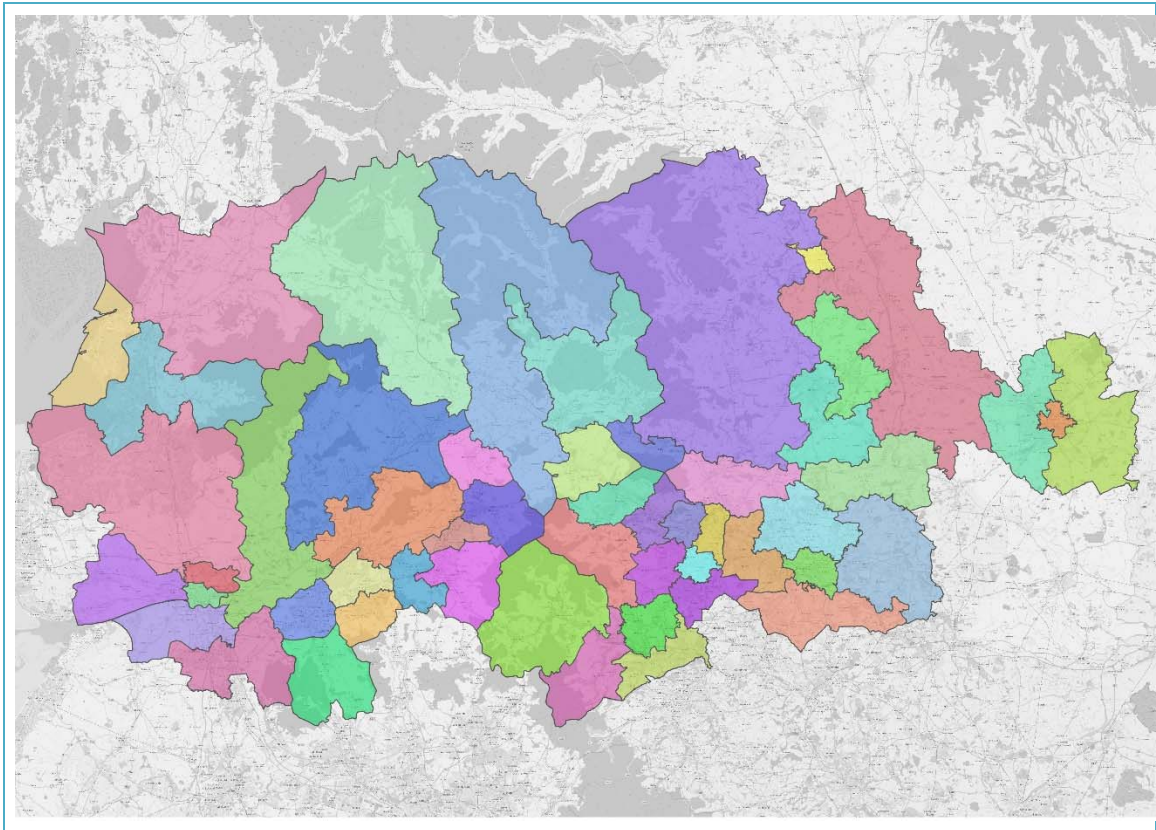
- 8.11 In developing the modelling approach there are a number of study specific issues that have had to be addressed. The details of these are described below.

Zoning Structure

- 8.12 The east – west connectivity study area covers a large and mixed geography across the north of England, broadly from Preston in the west to York in the east and from north of the M62 Corridor in the south to of the A66 Corridor to the north. Within this there is a broad mix of areas, ranging from dense urban regional centres such as Leeds and Bradford, to very rural areas such as North Craven or the Forest of Bowland. To therefore provide a representative analysis the study area was divided into 53 zones based on groups of Middle-layer Super Output Areas (MSOAs), shown in Figure 8.1. The colours within the figure are merely illustrative to allow the reader to see the zone structure.
- 8.13 These zones, rather than being based purely on administrative and political geography, instead followed the transport geography of the area. Where possible, rural and urban areas have been separated. This allows a relatively detailed model to be produced, with some areas having a very high density of zones, for example parts of East Lancashire and West Yorkshire, while other areas including rural North Yorkshire and parts of Lancashire were divided into a smaller number of large zones.

²¹ Source: WebTAG Unit A2.3 Appraisal of Employment Impacts (Draft for Consultation). DfT September 2016

Figure 8.1 East – West Connectivity Modelling Zones



8.14 The client brief described the study area Corridor as follows:

“This 'Central' Trans-Pennine Corridor comprises the M65/A56/A6068, A59 and A683/A687/A65 roads and parallel railways, including the Calder Valley line linking Preston, Blackburn and Burnley with Bradford and Leeds via Hebden Bridge and the line linking Lancaster with Leeds via Skipton”.

8.15 Our modelling was undertaken within this Corridor, focusing on these key east-west routes. We avoided east west movements in adjacent corridors (essentially the M62) or where north-south movements have a significant role in connectivity. This last point essentially means the A1 corridor to the east, and the M6 to the west, but also the M66 to Manchester. We therefore sought to exclude places that were strongly influenced by these neighbouring east-west and north-south corridors. Discussions took place with respect to Selby (A1), Rossendale (M66), Blackpool and significant growth sites in the west of Lancashire (M6), and Huddersfield (M62), all of which were excluded in order not to skew the analysis with the influence of movements that were not essentially about east-west business travel in the corridor in question.

8.16 For the purposes of this work we have assumed the below for the wider economic quantitative modelling only:

- Given Huddersfield’s location and current transport connectivity, the majority of its east-west movements into the corridor will be likely to be along the M62/TPE rail route to Leeds or Manchester and then up, which is outside of the scope of this study;
- The stretch of the A64 (A1(M) to York), and Selby district more generally, is not considered within scope for this work largely because routing would tend to be via the M62 corridor from a number

of places, rather than via the A59-M65 corridor. It is this latter corridor that is the focus for this work.

- Rossendale is excluded from the wider economic modelling as are Kirklees and Wakefield as these are considered to be too far south and fall within the M62 Corridor as per Huddersfield above;
- The unitary authority of Blackpool as well as the western parts of Fylde (west of Poulton-le-Fylde) and Wyre (to the west of the River Wyre Estuary) have been excluded from the wider economic impact modelling. It is important to note that the wider economic impacts modelling undertaken focuses on two very specific aspects of the economy, namely the agglomeration effects (which are derived from improved connectivity on business-to-business journeys) and the employment effects (derived from improvements to connectivity that widen the labour market). The importance of the visitor economy to Blackpool, and the influence of visitor trips as one of the principal sources of journeys to and from Blackpool would not be reflected significantly in either of these 'slices of the economy' which are captured within the modelling. The inclusion of Blackpool could therefore 'skew' the modelling outputs which do not pick up wider visitor economy based trips as they are focused on business to business movements. The western parts of Fylde and Wyre have also been excluded as they are geographically contiguous with Blackpool and the M55 remains the primary route to these areas from Preston and the wider Corridor to the East. The highway network west of the M6 along the M55 and other routes is relatively unconstrained in comparison to the central M65/A56/A6068, A59 and A683/A687/A65 corridors, and therefore, the requirement for road transport infrastructure investment is likely to be less of a priority. East West based rail connectivity to Blackpool North is via Preston and provides a regular service at present for largely local trips and visitors.

8.17 Centroid locations for each zone were identified based approximately on the centre of the zone, or in the case of more rural zones the most appropriate settlement.

8.18 Each zone was populated with local employment information taken from the 2011 Census. Employment numbers within each zone are distinguished by type, and allocated to one of four economic sectors for use in the agglomeration model. These sectors are:

- Manufacturing
- Construction
- Consumer Services
- Producer Services

8.19 GDP data at employee level was calculated for each zone based on the GDP per employee for the local authority area in which the zone is located. For zones which cross a local authority boundary an appropriate weighted average has been calculated.

8.20 In addition to the zones within the study area, zones external to the study area have been created to allow the agglomeration model to function correctly. These zones cover the rest of the England and Wales and are based on government office region geographies.

Modes

- 8.21 The model contains the capability to model five principal modes for journeys within the study area. The modes included are:
- Car
 - Rail
 - Bus
 - Cycle
 - Walk
- 8.22 Bus, cycle, and walk are included to ensure that all commute trip types can be included within the model, although none of the test scenarios include changes to these modes. The inclusion of walking and cycling modes are especially important for the purpose of correctly calculating the level of economic activity within individual zones, where these modes represent a significant proportion of trips.

Trip Data

- 8.23 Fundamental to this assessment is the calculation of the number of trips across the study area. In the absence of data from an appropriate traffic or multi modal model covering the area, Census data has been used to provide a partial understanding of the movements in the area. While this data is satisfactory for use in the employment model, data on business trips is also required to operationalise the agglomeration model. Using data from the National Travel Survey it has been possible to estimate the relationship between the volumes of business and commute trips over distance. Having identified this relationship it is then possible to estimate the number of business trips from the number of commute trips, the latter obtained from Census data.
- 8.24 A caveat to this approach is the distribution of commute trips over longer distances. In most cases there are a small number of commute trips to the key settlements from a large number of zones. Consequently the greatest weakness lies in linkages to more rural zones.

Calculation of Generalised Costs

- 8.25 Fundamental to the calculation of the wider economic impacts is the calculation of generalised costs across the modes. For bus, cycle and walk trips, average generalised costs are estimated based on distances and the average speeds of these modes taken from other data sources, plus money costs such as fuel and fares as appropriate.
- 8.26 However for rail and highway trips generalised costs have been estimated using data from journey planners. In the case of highway trips it was possible from journey planners to obtain minimum and maximum journey times, which in turn has allowed an assessment of the impact of journey time variability to be made, as minimum, average, and maximum generalised costs have been calculated from these data.
- 8.27 For rail trips the use of journey planning software (as opposed to rail timetables) has allowed a greater coverage of potential rail trips, enabling the inclusion of some areas where rail is only part of a journey. For example, for trips from parts of East Lancashire (such as Barnoldswick) to Leeds, a bus journey to Skipton combined with a rail journey to Leeds can be relatively competitive with a car trip.

Treatment of External Zones and Irrelevant Zone Pairs

- 8.28 To complete the model within the requirements of the DfT's WebTAG it was necessary to estimate links to a range of external zones, the inclusion of which has been previously described above.

However, as these areas lie outside the study area, no changes were estimated for these zones when tests were completed in the model.

8.29 In addition it was necessary to identify a number of pairs of zones within the study area that, although required to make the model function, did not meet to the overall objectives of the study to examine east – west strategic connectivity. To this end all zone pairs that met the following criteria were excluded from the study:

- All zone pairs less than 10 miles apart;
- Zone pairs on the boundary of the modelled area that ran north – south rather than east – west, for example Preston – Lancaster, Leeds – York, and Leeds – Bradford.

8.30 Within the model tests the generalised costs for all of the zone pairs were held constant.

The model tests

8.31 To provide an understanding of the potential wider economic impacts of future strategic transport investment across the area, nine tests have been conducted covering a range of scenarios reflecting improvements to road and rail, both separately and in combination. The tests also include consideration of the impacts of different scales of intervention.

8.32 The tests avoid identifying and testing specific schemes. Instead the modelling has focussed on what the overall output would be, in terms of generalised cost or journey time reduction. The tests undertaken, together with their respective sensitivity tests are described below.

Tests 1 & 2: Rail & Road 10% & 20% Reduction in Generalised Cost

8.33 The first tests examine the impact of lowering total journey costs for rail and road trips by 10% and 20%. The focus of these tests is on strategic flows, defined as those over 10 miles, with the aim of gaining an understanding of the impact of a blanket reduction in travel costs across a large area. A reduction in generalised cost could cover a broad mixture of measures, as it includes both time and cost elements of journeys. For example it could involve the delivery of a small number of large schemes, a broad package of smaller measures over a large area, fares reductions in rail services, or frequency enhancements on rail services. Testing both 10% and 20% reduction enables some understanding of the impact of scale, and whether or not returns diminish or increase with scale.

Tests 3 & 4: Highways Only 10% & 20% Reduction in Generalised Cost

8.34 These tests are very similar to Tests 1 and 2 above. However these tests focus exclusively on the highway network. This is in recognition of the dominant role that the highway network plays in the area. As with the all modes tests above, such scenarios might be delivered through a mixture of measures such as large schemes dealing with bottlenecks, or a package of smaller schemes across a large area. Again, testing both 10% and 20% reduction enables some understanding of the impact of scale, and whether or not returns diminish or increase with scale.

Tests 5 & 6: Impact of Highway Reliability

8.35 A particular issue with the highway network across the defined study area is journey time variability. There are a range of reasons for this, dealt with elsewhere in this study, but can broadly be summarised as being related to one of two circumstances:

- A small number of major bottlenecks where journey reliability is poor and journey times vary significantly by time of day; and,
- A number of key routes that have a mixture of traffic with differing speed profiles, particularly HGVs and agricultural vehicles that can cause random patterns of delay across the network.

- 8.36 To understand this impact, minimum and maximum journey time data was collected for highways trips, in turn allowing average journey times to be estimated. Using this information Test 5 examines the impact of moving all highways journey times from average to minimum journey times, effectively introducing free flows conditions for highway movements across the whole network. Whilst this is theoretical in the sense that it is unlikely that free flow conditions could be introduced across the whole network it is useful to understand the effect of such a change over a large area. Test 6 compares the effect of moving from maximum to average journey times. This is examined as it is likely that users making important journeys such as business trips will plan based around maximum rather than average or minimum journey times to ensure reliability. This test therefore examines a situation where users could plan based around existing average rather than maximum journey times.

Tests 7 & 8: Cross Pennine Highway Journey Time Reductions

- 8.37 Given the focus of this study on East – West Connectivity between Lancashire and Yorkshire it is appropriate to conduct tests focussed solely on cross Pennine journey time reductions. This provides a particular focus on the key links in the road network linking Lancashire and Yorkshire in this area, notably the A65, the A59, the M65/A56/A6068, and the A646. These links have a broad mixture of characteristics, and there are known congestion and journey time reliability issues.
- 8.38 The tests implemented here involve applying a 10 minute journey time reduction to all links crossing between Lancashire and Yorkshire on these routes, and repeating this for a 20 minute journey time reduction to enable understanding of the impact of more substantial change on the network. For shorter distance links a cap has been applied of a maximum average speed of 60mph. This avoids any issues relating to the creation of implausible journey times. This approach is useful for identifying the scope for the development of the east – west economy as a whole, especially as analysis of Census data suggests that cross boundary commuting is relatively limited at present.

Test 9: Rail Only Test

- 8.39 Having examined a number of highway only options, Test 9 examines a rail only option to try and enable understanding of the value of transformational change in the quality of the rail network. To achieve this a 25% reduction in generalised cost has been applied to all zone pairs where rail is an available option. Given the nature of the rail network and its existing usage this tends to focus on access to principal centres such as Leeds, Bradford and Preston. This therefore tests the impact of a large change in journey times on a smaller group of zone pairs. A 25% reduction has been adopted as this has been identified by Rail North as an aspiration for the reduction in generalised cost across the whole of the rail network in the north. This defined aspiration from Rail North has set the standard for the desired level of improvement within the northern rail network, reflecting the slow journey times and low frequencies prevalent on many services at present.

Results of the analysis

8.40 The following sections present the finding of the modelling work. The first section provides a headline summary of the results, followed for each test in turn by evidence on the spatial impacts. The table below presents the summary results for both the agglomeration and employment models.

Table 8.1: Agglomeration and Employment Model £m GDP per annum

	Description	Agglomeration Model	Employment Model	Total	Rank
Test 1	10% GC Reduction	£30.16	£4.42	£34.58	3
Test 2	20% GC Reduction	£61.52	£9.77	£71.30	1
Test 3	10% GC Reduction (Highways)	£18.77	£3.62	£22.4	5
Test 4	20% GC Reduction (Highways)	£30.32	£8.30	£36.63	2
Test 5	Average to Minimum JT	£15.70	£2.08	£17.79	6
Test 6	Maximum to Average JT	£6.98	£2.09	£9.08	9
Test 7	10 minute Cross Pennine Reduction	£10.92	£0.90	£11.82	8
Test 8	20 minute Cross Pennine reduction	£11.25	£1.01	£12.26	7
Test 9	25% Rail GC Reduction	£30.75	£1.74	£32.49	4

- 8.41 The table shows, unsurprisingly, that the 20% reduction in generalised cost across both rail and road trips has a substantial impact on GDP generating an additional £71.3m per annum across the two models. A 10% reduction brings just under 50% of the benefits of a 20% reduction suggesting that there are still increasing returns to a reduction in generalised cost across both modes. The test that generates the highest annual GDP uplift (i.e. Test 2) is unsurprising given the scale of the change to the transport network that a 20% reduction in generalised cost implies. It also strongly demonstrates that investment in road and rail together are complementary, and both have a place in resolving the transport issues in this corridor. It is important to note that this analysis ignores the capital costs of delivering the assumed scenarios at this stage and clearly this will need to be accounted for as specific interventions are identified and developed going forward.
- 8.42 The second highest result is from a 20% reduction in generalised costs for highway trips, followed in third place (as noted above) by a 10% reduction in generalised cost for road and rail.
- 8.43 The fourth highest valued test is a 25% reduction in rail journey costs. Rail flows are typically targeted at major settlements where there are more likely to be high value jobs, for example in the producer services and consumer services sectors. In addition rail services do not suffer from time related congestion issues on the approach to major centres in the same way that road trips do. This test, in spite of the relatively limited rail network in terms of the connections it provides, illustrates the potential transformational benefits of investment in rail for those places served.
- 8.44 The impact of improving journey time reliability is more limited in terms of GDP benefits. This is thought likely to be a reflection of the pattern of journey time reliability issues. In particular those longer journeys that suffer the most from significant journey time variability (often having to pass through a number of congestion hot spots or of increased likelihood of suffering from slow moving vehicles) are relatively fewer in number in comparison to the number of shorter highway journeys. For

example trips falling into this test might include Preston to York, which potentially have to deal with issues on the M65, plus congestion around both Colne and Harrogate, and on the approaches to York. In spite of this, the results of the test, from which short trips with potentially huge variability in journey times have been removed, shows relatively lower benefits in comparison to network wide improvements. It also illustrates the potential importance of addressing reliability issues on short trips.

- 8.45 The 10 minute and 20 minute highway journey time reductions for cross Pennine movements show quite limited impacts compared to other options. However the results are more positive than they initially appear. Firstly, the total number of potential zone pairs is significantly reduced in these options compared to the other tests. In addition, for some zone pairs close to the boundary line a maximum speed cap will limit the potential growth in these areas. This model test is also influenced by the existing pattern of trip making, and that existing pattern of trip making across the boundary between the two areas is relatively limited, and therefore the model is uplifting from a relatively low base.
- 8.46 The scale of agglomeration benefits is significantly larger than the employment benefits estimated. This is in large part due to the exclusion of zone pairs that are less than 10 miles apart. These zone pairs are likely to contain the bulk of commute trips, with the proportion of commute trips over 10 miles being much lower.
- 8.47 Overall the results suggest that there would be considerable benefits to the wider economy from investment in improved east – west connectivity. And, in all cases there is the potential for additional benefits from movements further afield to other areas of the country, including entirely external movements that pass through the study area (e.g. from Scarborough to Blackpool, for example). These benefits are not modelled within this study.

Tests 1 & 2: 10% & 20% Generalised Cost Reductions

- 8.48 The 20% generalised cost reduction option provides the greatest level of benefit of the 9 tests, with the 10% scenario showing the third largest benefits. These scenarios spread the benefits over a very wide area. The maps presented below show the scale of benefits for agglomeration, employment, and total benefits at zone level for the 20% scenario. The pattern for the 10% scenario is similar but with lower absolute values.

Figure 8.2 20% Generalised Cost Reduction – Agglomeration Spatial Impact

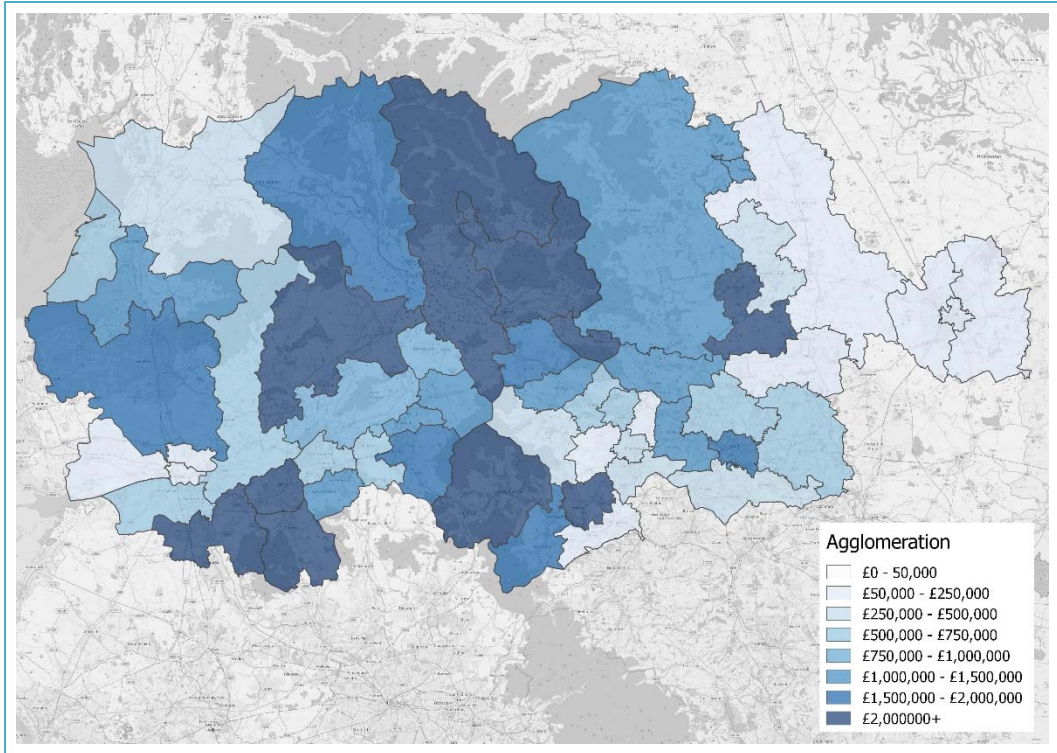


Figure 8.3 20% Generalised Cost Reduction – Employment Spatial Impact

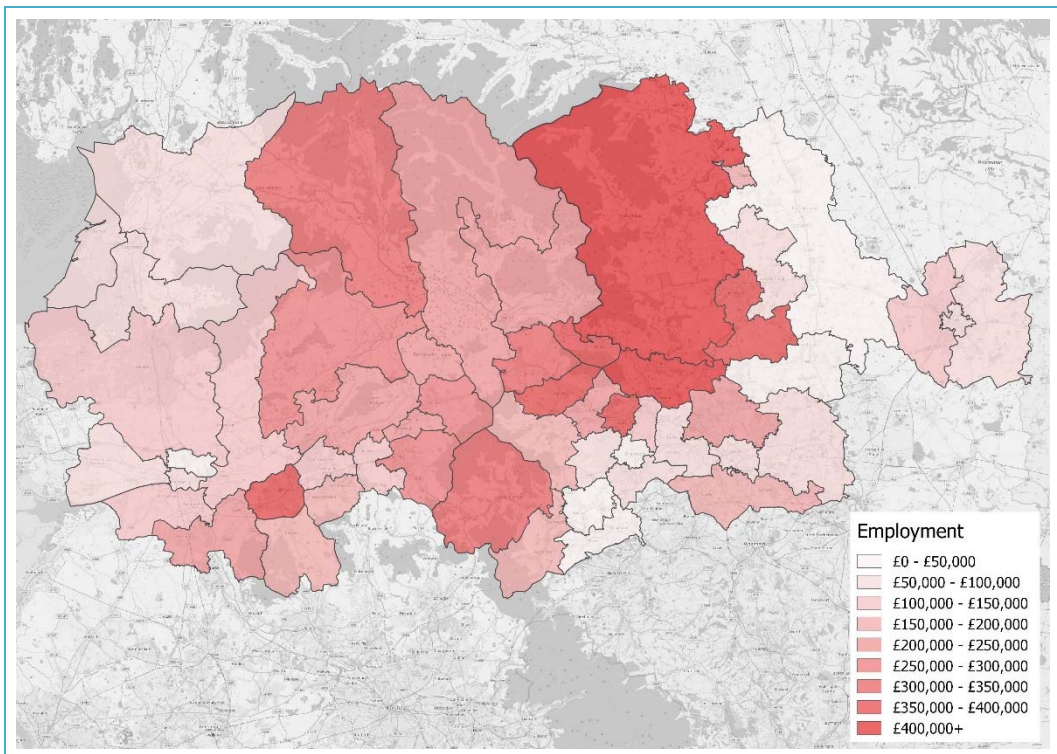
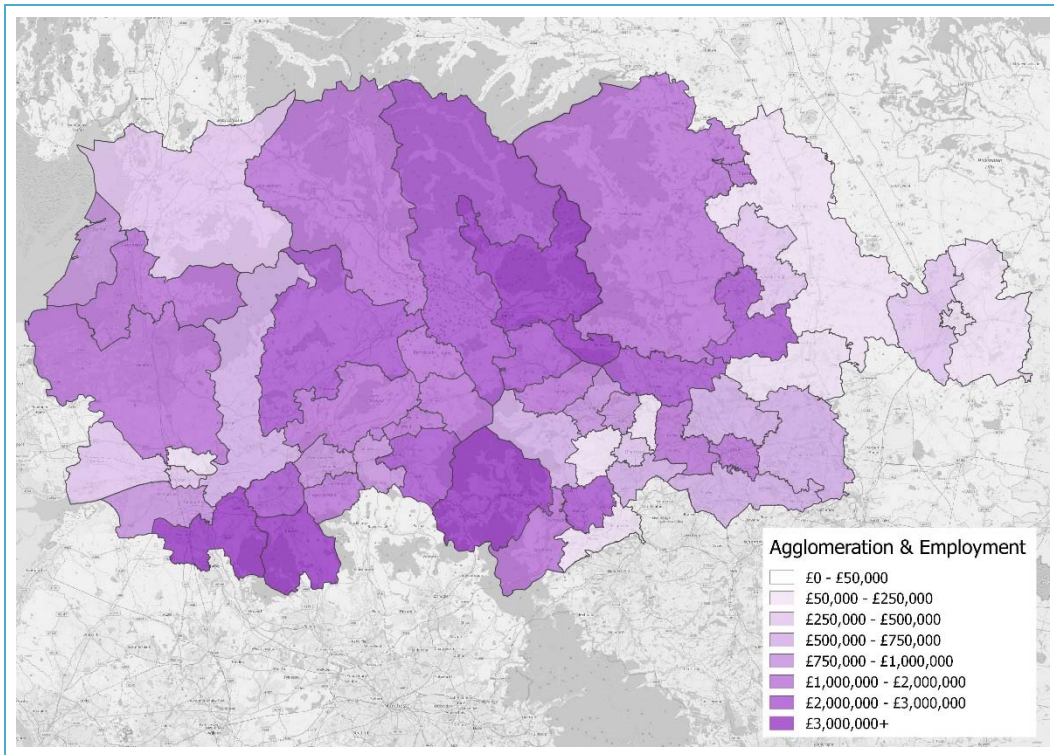


Figure 8.4 20% Generalised Cost Reduction – Total Impact



- 8.49 The results presented are relatively intuitive. Areas towards the centre of the study area tend to benefit most in this scenario as they have comparatively good access to all areas of the study area, particularly after a reduction of 20% in generalised cost.
- 8.50 Within the agglomeration results it is noticeable that Skipton, Clitheroe, the area south of Preston, the Upper Calder Valley, and Harrogate all benefit. In contrast the results of the employment model tend to favour the Harrogate and Skipton area, Blackburn, and Hebden Bridge. The agglomeration results in particular show the impact of bringing the area closer together with nodes in the network such as Skipton, Harrogate, and the area south of Preston, close to the Motorway network benefiting in particular.
- 8.51 The employment map does show evidence of some rural areas benefiting. This is likely to be due to the improved access to areas with a larger number of jobs especially where out commuting is already significant.

Tests 3 & 4: Highways only 10% & 20% Generalised Cost Reductions

- 8.52 These tests are very similar to tests 1 and 2, but are limited to improvements to the highways network only. The maps presented below show the scale of benefits for agglomeration, employment, and total benefits at zone level for the 20% scenario. The pattern for the 10% scenario is similar but with lower absolute values.

Figure 8.5 20% Generalised Cost Reduction (Highway Only) – Agglomeration Spatial Impact

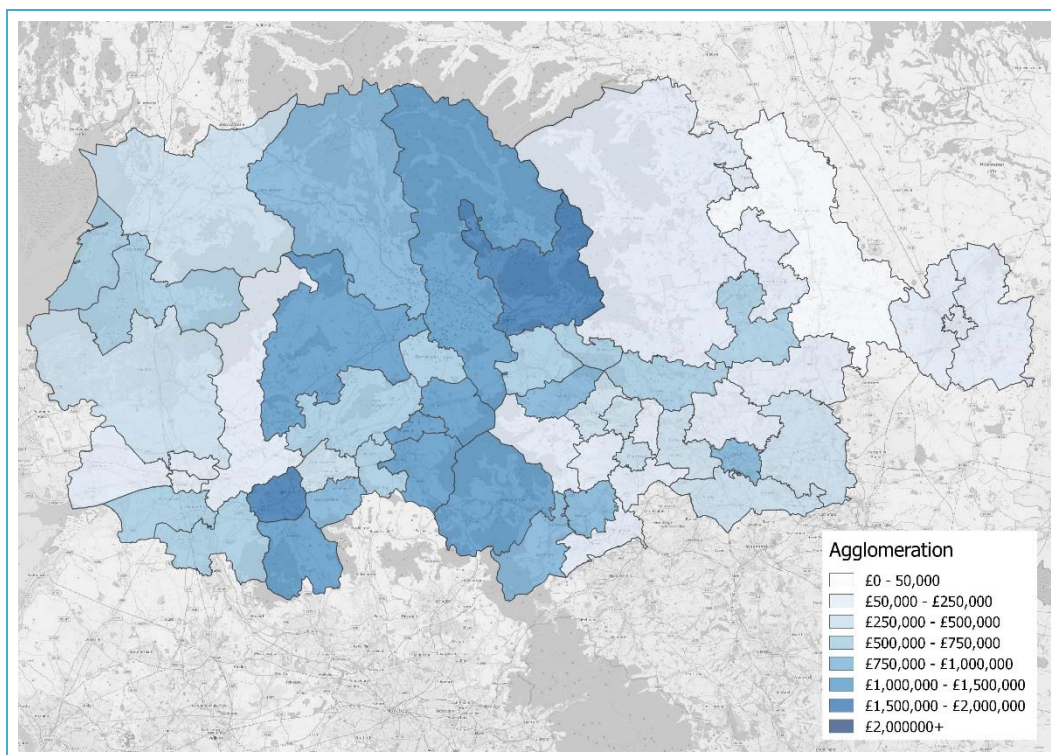


Figure 8.6 20% Generalised Cost Reduction (Highway Only) – Employment Spatial Impact

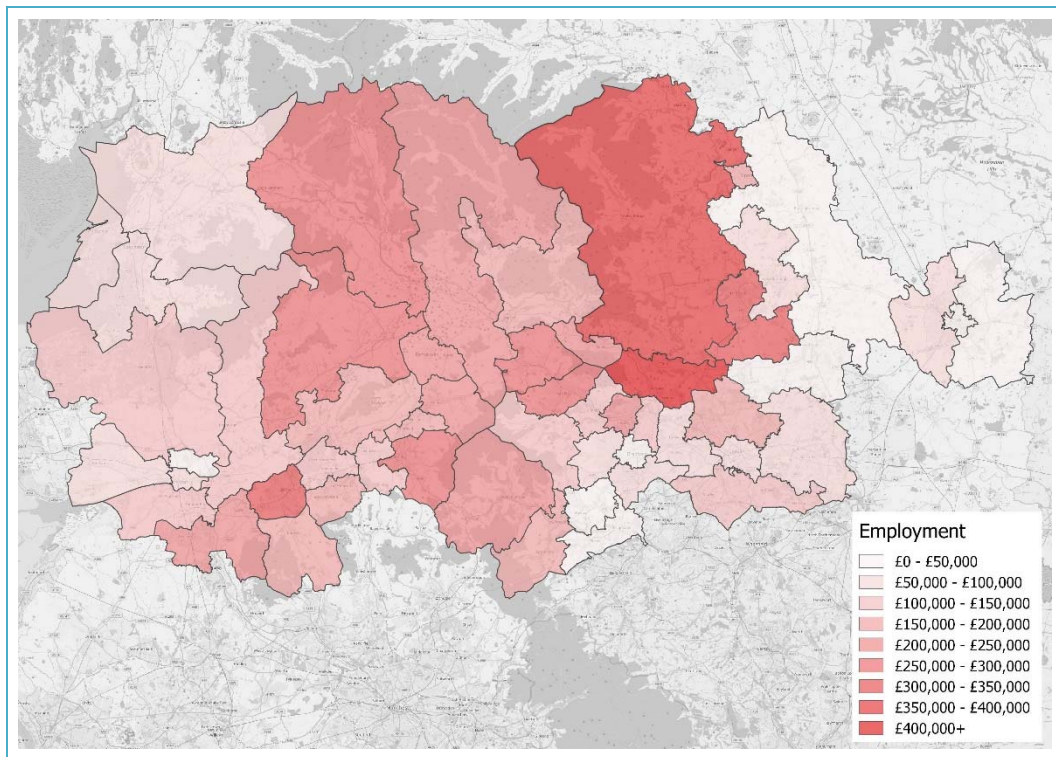
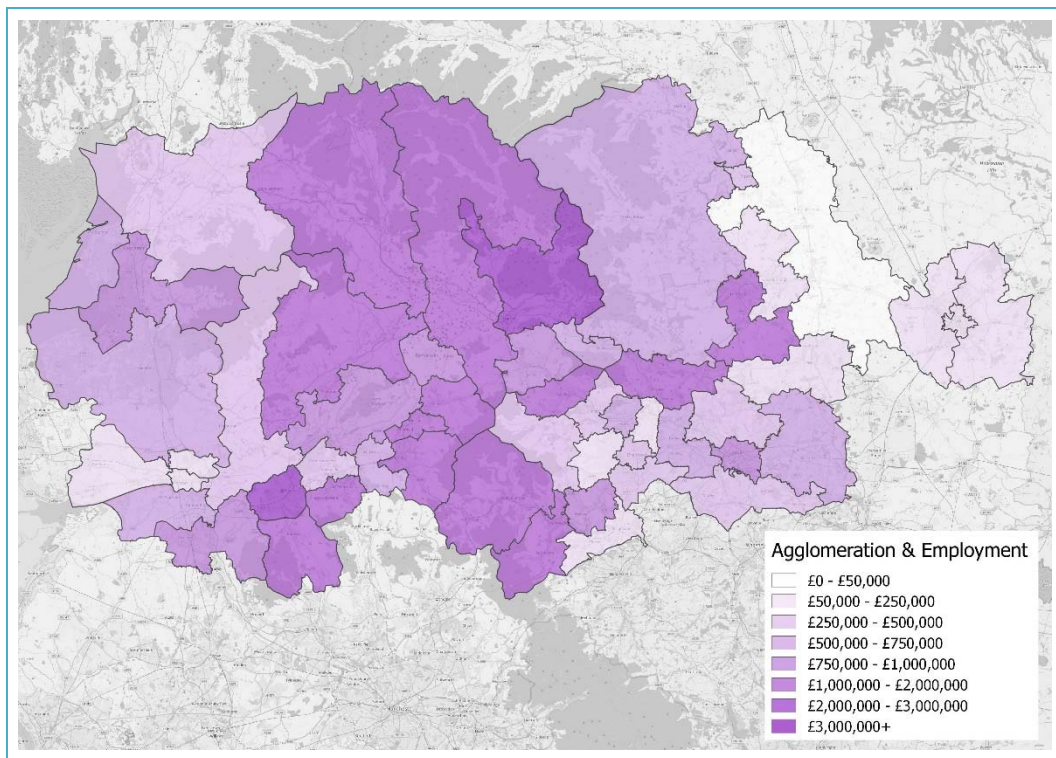


Figure 8.7 20% Generalised Cost Reduction (Highway Only) – Total Impact



8.53 The agglomeration impact of the highways only tests presents a slightly different pattern to tests 1 and 2, showing the impact of the differing geography of the road and rail networks in the area. The employment map is however very similar to the all modes tests employment map with areas around

Harrogate and also Blackburn showing benefits. It is also clear that there are relatively limited benefits within West Yorkshire and the York area, largely because cross boundary commuting trips are relatively limited from this area. The map showing total benefits indicates that Harrogate, Skipton, and Blackburn have the most significant benefits, along with other parts of the more central area, notably the Calder Valley.

Tests 5 & 6: Journey Time Reliability

- 8.54 Tests 5 and 6 examine journey time reliability across the highway network. The results for these tests do not show large benefit, potentially reflecting the issue that longer journeys will have greater variability in journey times, but that there are fewer of these journeys overall. In addition very short trips subject to variability due to local issues are excluded from this assessment. The maps below show the spatial impact of the option for moving from average to minimum journey times (Test 5). The maps clearly indicate how much weaker the overall impact of journey reliability is relative to the four earlier tests. Part of this is related to the way in which the impacts are distributed across the area. Overall the greatest reliability benefits appear to come from Leeds, Skipton, Halifax, Lancaster and Clitheroe.

Figure 8.8 Journey Time Reliability – Agglomeration Spatial Impact

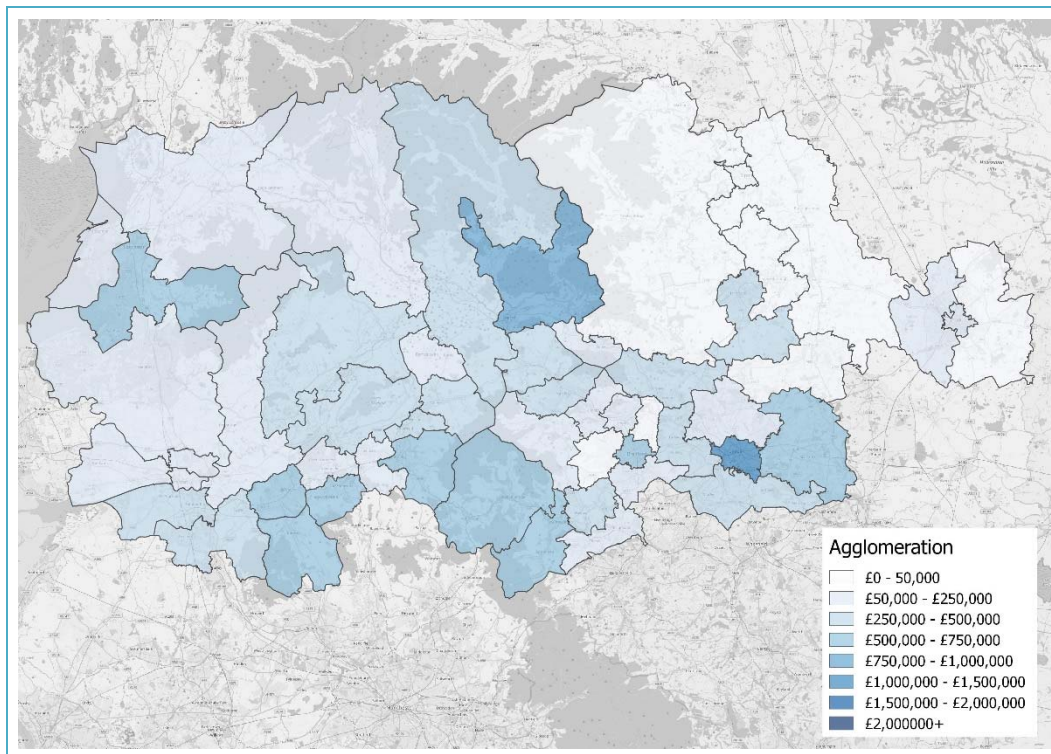


Figure 8.9 Journey Time Reliability – Employment Spatial Impact

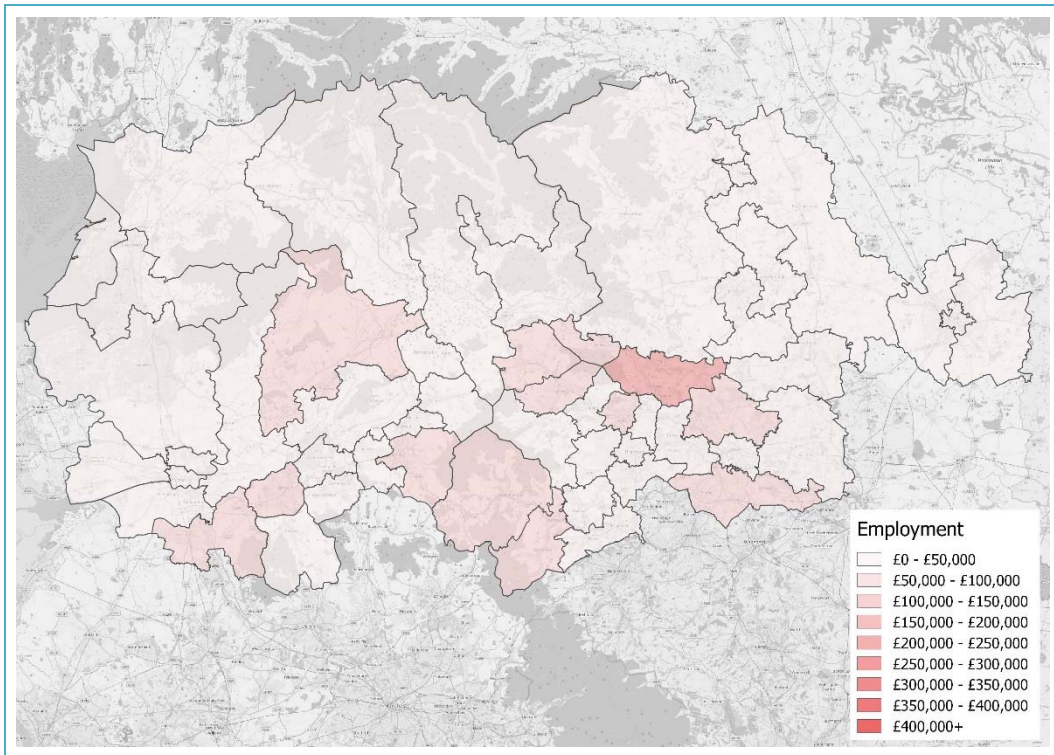
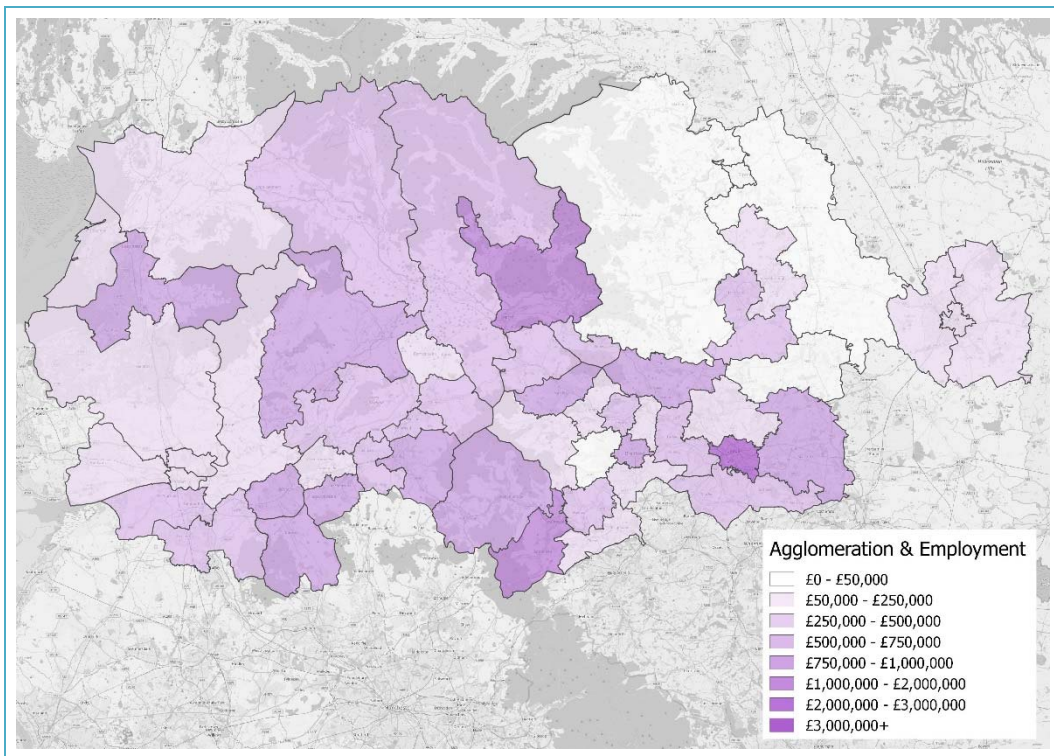


Figure 8.10 Journey Time Reliability – Total Impact



Tests 7 & 8: Cross Pennine Journey Time Reductions

8.55 Tests 7 & 8 look at the impact of reducing journey times for east – west journeys crossing between Lancashire and Yorkshire. This looks at an area where connectivity may be at its weakest, and where Census data shows that at the current time there is divide in travel to work patterns. The tests examine a 10 minute and 20 minute reduction in journey times for cross Pennine trips – with a cap applied preventing average speed rising above 60mph, the latter being relevant for short trips. Overall the total results for this were poorer than for other tests. However the approach excludes large numbers of zone pairs that do not cross the boundary between the east and west areas. The maps below present the results for the 10 minute cross Pennine journey time reduction by origin zone.

Figure 8.11 Cross Pennine Journeys – Agglomeration Spatial Impact

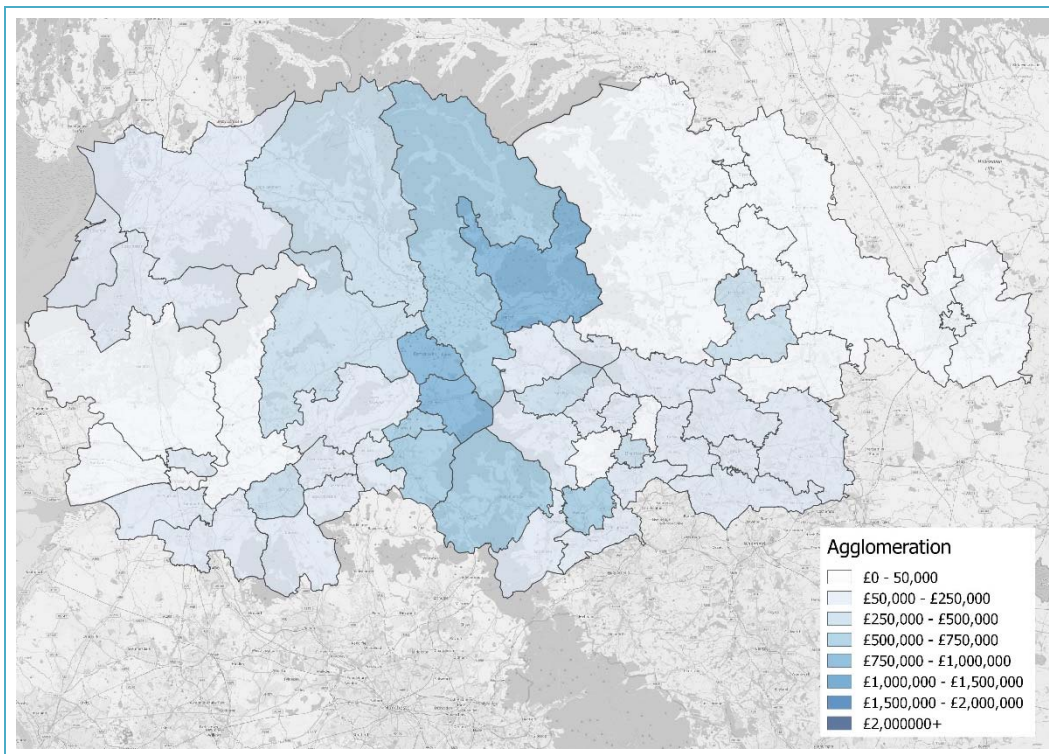


Figure 8.12 Cross Pennine Journeys – Employment Spatial Impact

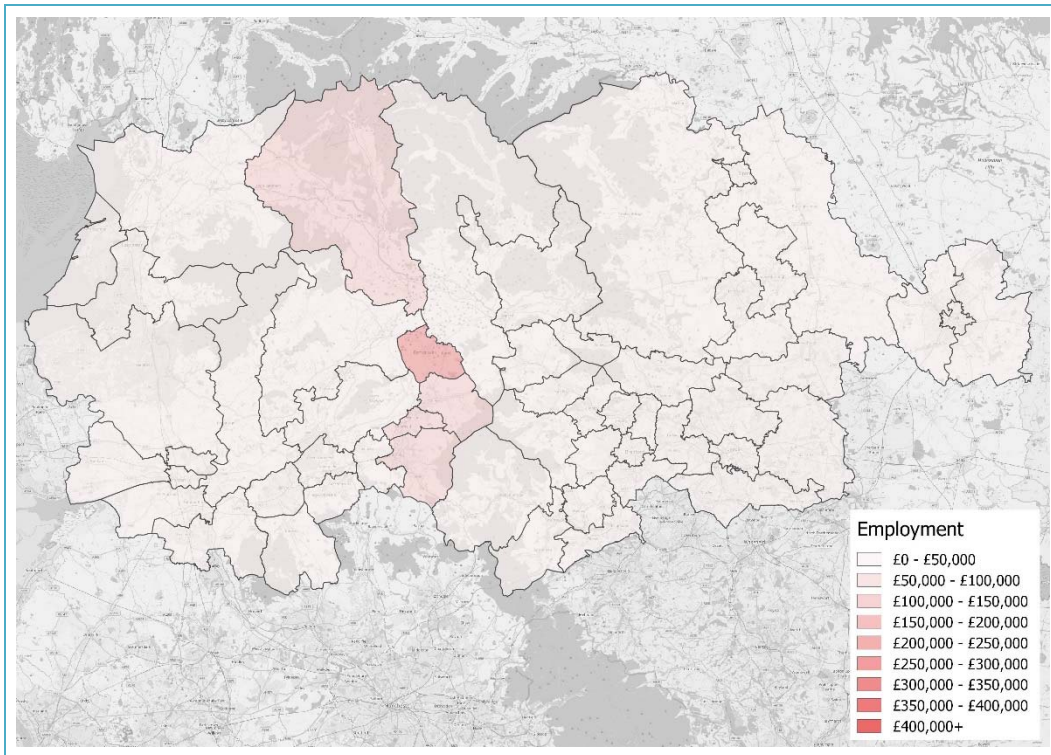
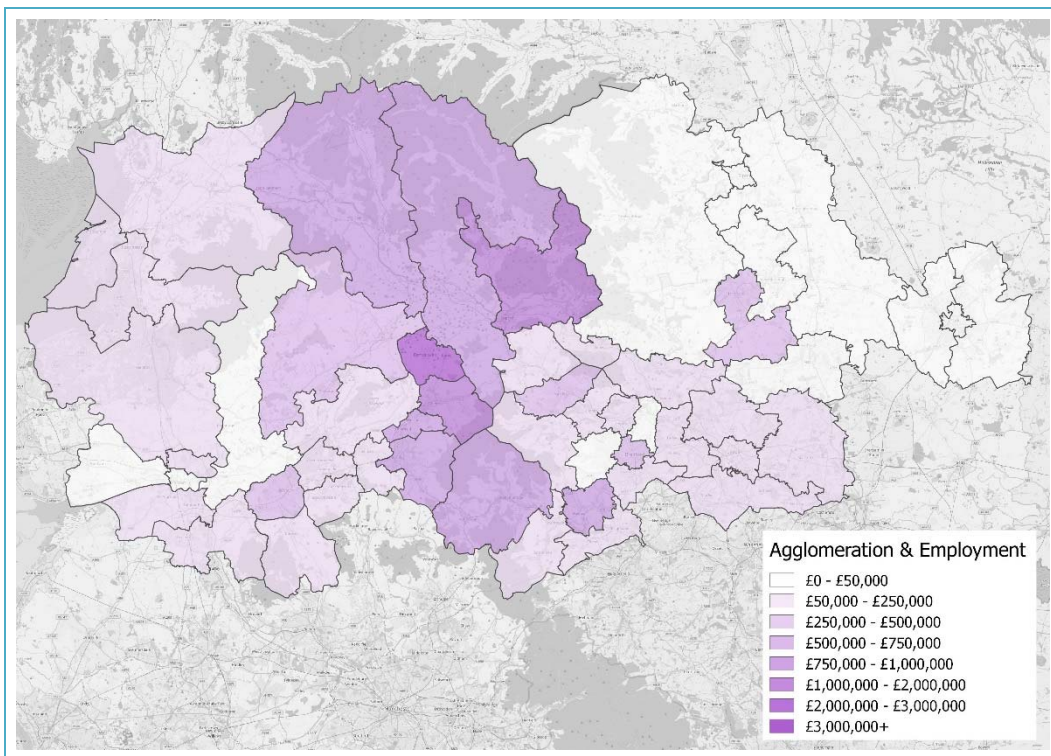


Figure 8.13 Cross Pennine Journeys – Total Impact



8.56 The results for a 10 minute journey time reduction clearly show how the areas close to the centre of the study area benefit with zones in Craven, Calderdale, and Pendle benefitting the most. Areas further west and east gain less benefit as a 10 minute journey time reduction forms a lower proportion

of total journey costs. Given that the closest zone pairs are excluded (i.e. those less than 10 miles apart) the types of trip that benefitting the most from these options would include Skipton to Blackburn, or Colne to Harrogate. A 20 minute reduction in journey times does not show a significant increase in benefits over the 10 minute scenario. This may be because a large number of shorter movements are excluded by the 60 mph maximum speed cap, leaving only longer journeys with a lower number of total trips included within the methodology.

Test 9: 25% Rail Generalised Cost Reduction

8.57 This test examines the potential impacts of transformational investment in the rail network across the study area. The test involves a 25% reduction in generalised cost across the whole of the rail network, which could be delivered through a combination of journey time reductions, improvements in frequency, reductions in the need to interchange and improvements in access to rail stations. The spatial outcomes are shown in the suite of maps that follow.

Figure 8.14 25% Rail Generalised Cost Reduction – Agglomeration Spatial Impact

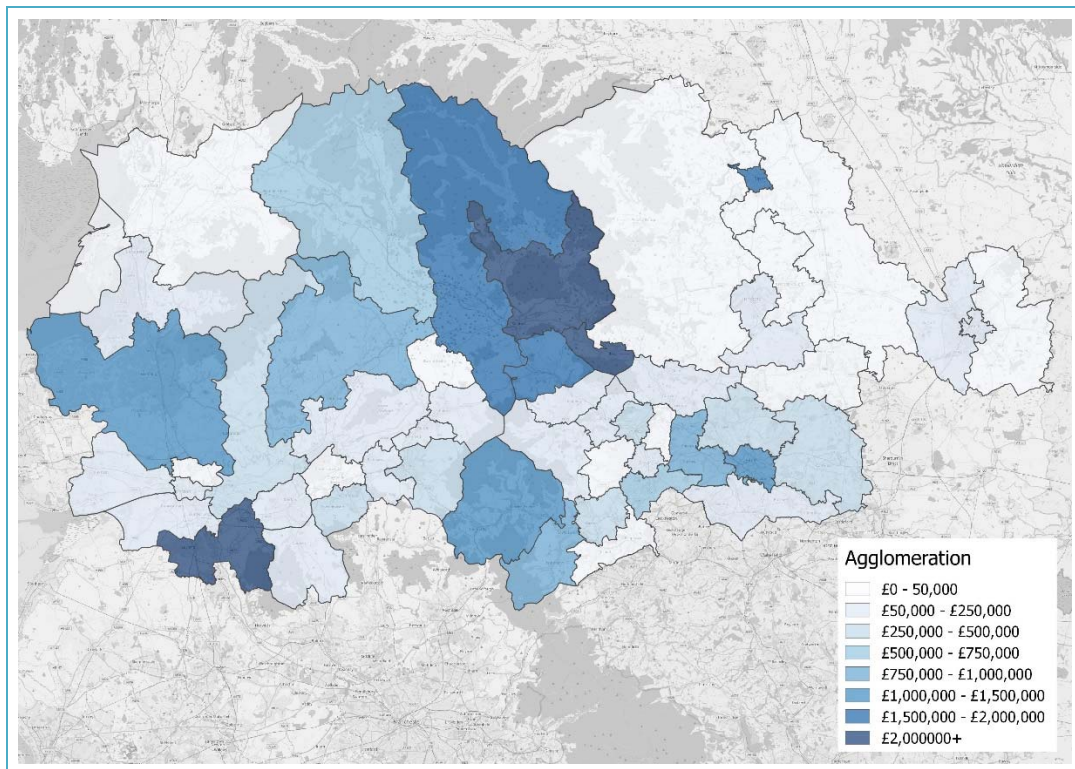


Figure 8.15 25% Rail Generalised Cost Reduction – Employment Spatial Impact

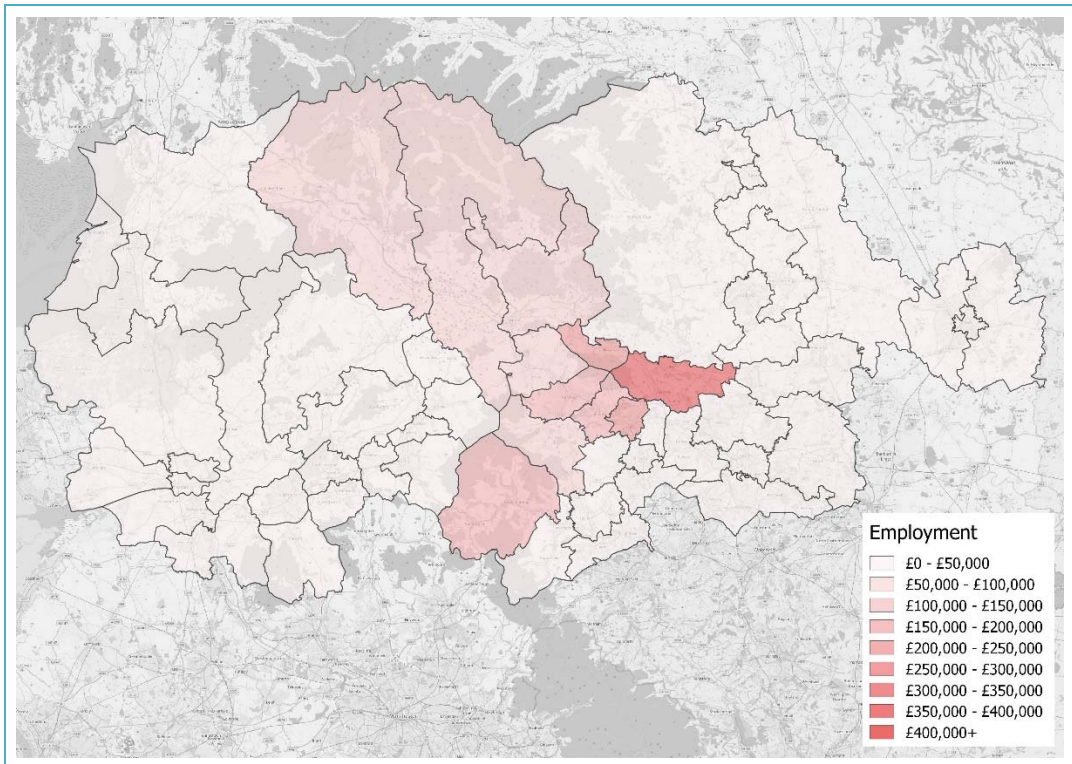
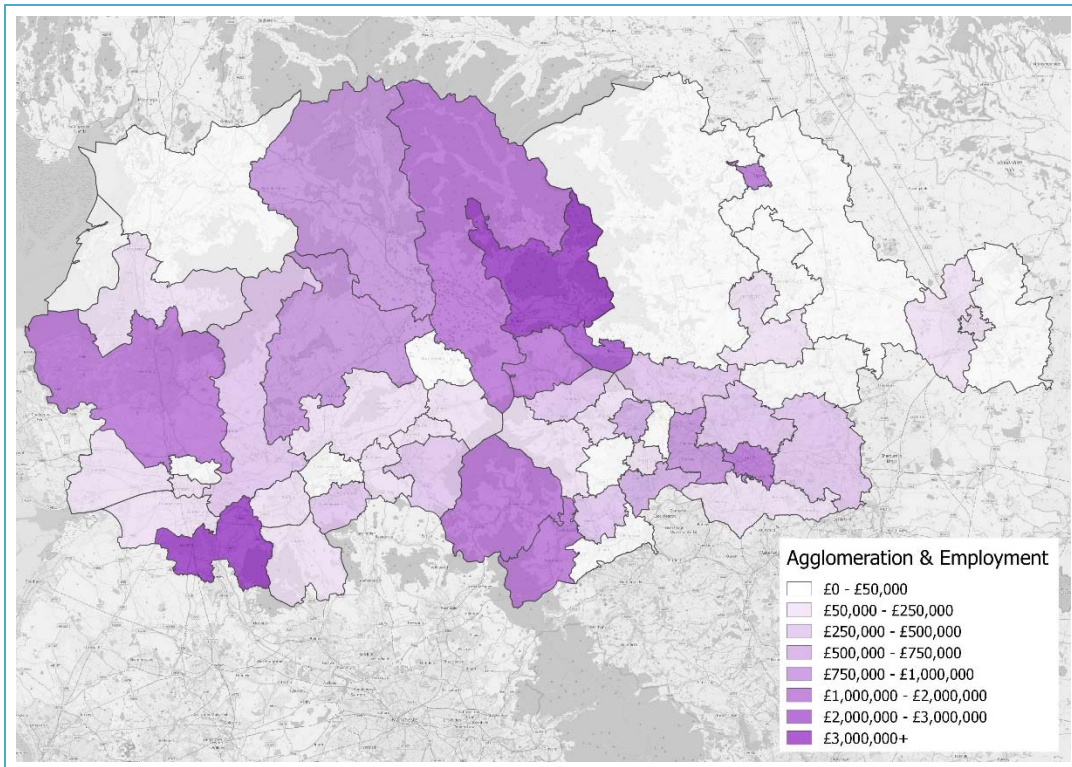


Figure 8.16 25% Rail Generalised Cost Reduction – Total Impact



8.58 The maps show that the strongest benefits accrue from areas where the rail service is already relatively good, notably Skipton, South Craven, parts of Calderdale, Harrogate and Preston. In

contrast there is little benefit in East Lancashire. This is possibly because the existing rail service (especially on the Preston – Colne route) is so poor that a 25% change in generalised cost does not improve matters significantly.

Sensitivity Test for Test 9: A new rail route

- 8.59 The research is intended to show in strategic terms the importance of improving transport networks in the corridor. The work illustrates the potential scale of wider economic benefits that might be gained from investments to deliver such improvements, but has remained deliberately scheme agnostic, so as not to pre-judge what any solutions might be.
- 8.60 However, there is a long standing ambition amongst stakeholders in the area to re-open the former Skipton to Colne rail link. A sensitivity test was therefore applied to the rail only test (test 9) assuming that the rail link between Skipton and Colne were to be re-opened. This sensitivity test takes as its starting point test 9 as reported above, namely a 25% reduction in generalised cost across the existing rail network, in itself a substantial improvement. The sensitivity test acknowledges the long standing proposal that would in effect join two discrete parts of the rail network and provide a more coherent rail network across the study area as a whole.
- 8.61 The impact on public transport generalised costs of this sensitivity test is very significant in some cases, particularly for links from those parts of East Lancashire located east of Burnley to locations in West Yorkshire. Indeed, this would result in a reduction of generalised costs significantly in excess of the other tests undertaken within the study. The re-opening of Skipton to Colne would also assist with the delivery of a 25% reduction in generalised cost for some existing rail flows where rerouting would be possible with opening of a new line.
- 8.62 The modelled outcome of adding Skipton-Colne reopening to the 25% network wide reduction in rail generalised costs would be to generate £43.47m of GDP benefits per annum. Given the scale of the changes modelled (opening a new transport link has transformational potential not included in any of the other central tests modelled) this result is intuitive, and is amongst the highest of the tests modelled. The sensitivity test builds on the 25% reduction in generalised costs across the whole rail network, and shows that there is the potential to add a third more in additional benefits over and above those generated by investment across the network, again an intuitive outcome given that this adds a totally new link into the rail modelling. It should not diminish the case to argue for network wide improvements that show such widespread benefits in test 9.

Summary

- 8.63 Overall, there is considered to be a robust and compelling quantitative and qualitative economic case for enhanced East-West Connectivity across the Central Corridor. Improved connectivity would not only address the economic challenges and ambitions of the Corridor itself but it could also enhance the wider economic prosperity of the North as a whole and enable the Corridor to provide a complementary route to the M62 corridor to provide additional resilience to Trans-Pennine connectivity more generally, a key pan-Northern objective in terms of road and rail, passenger and freight movements. A failure to improve East-West connectivity and address current connectivity constraints would be likely to critically restrict the growth potential of the Corridor economy, as a key driver of the wider Northern Powerhouse economy.
- 8.64 The analysis has demonstrated that there will naturally be significant economic benefits of investing in both road and rail infrastructure and both modes are important to meeting current and future economic needs. An optimum investment strategy would include a phased approach comprising multi-modal investment to address both strategic transport connectivity and 'pinch point' resilience issues, the latter particularly from a road perspective.

- 8.65 There is a limited rail network across the Corridor, particularly in East Lancashire and the provision of an enhanced rail network would need to be aligned with local demographic and business/economic need and growth opportunities. Rail flows are typically targeted at major settlements where there are more likely to be high value jobs, for example in the producer services and consumer services sectors, and rail networks can also significantly enhance accessibility to urban centres to improve the mobility of labour supply. The case for transport investment within the Corridor needs to relate to the current and future economic drivers of the Corridor and these are varied, although appear to focus significantly on advanced and innovative manufacturing based activity, which is likely to continue to be dependent upon an efficient road transport network, along with other key sectors such as logistics, food and drink and energy. However, other professional service based growth sectors such as digital and health/life sciences may be more reliant upon enhanced rail services to enhance their output and growth prospects, particularly through enhanced agglomeration and access to skilled labour.
- 8.66 The wider economic impact modelling work shows that there are potentially large economic benefits from making significant (non-marginal) changes to the transport network across the East – West Connectivity study area. There are a variety of ways that this could be delivered and the modelling has shown strong positive impacts for both road and rail investment and a mixture of the two. The areas that benefit most consistently from such investment are towards the centre of the study area, reflecting the pattern of trip making and their central location. The analysis points to a need to focus on both rail and road investments, ensuring that the business case for investment is fully aligned to the economic needs and opportunities of the economy.