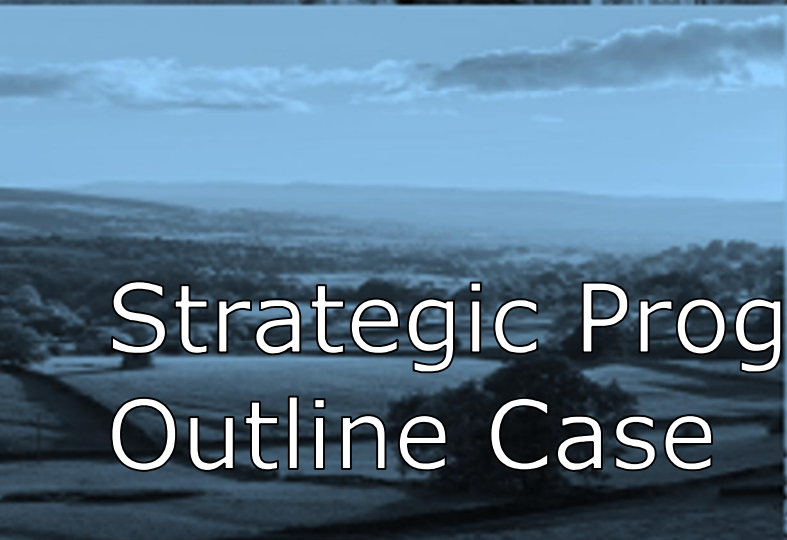




# Central Pennines: Strategic Development Corridor



# Strategic Programme Outline Case



February 2019



 TRANSPORT FOR THE  
**NORTH**

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## Supporting documents

A standalone Executive Summary has been published separately

Further detailed evidence is available on TfN's website at:

[www.transportforthenorth.com](http://www.transportforthenorth.com)



# 1 Introduction

## Background

- 1.1 The people of the North are at the heart of the Transport for the North's (TfN's) Strategic Transport Plan (STP)<sup>1</sup>. An effective, efficient Northern transport network is a fundamental part of everyday life – connecting people to jobs, health, education and leisure opportunities, connecting businesses to each other and allowing the efficient movement of goods and services. A transport system that is fit-for-purpose with strong north-south and east-west connections will be the backbone of a strong economy for the North and for the UK.
- 1.2 The STP has a horizon year of 2050 to align with the *Northern Powerhouse Independent Economic Review* (NPIER)<sup>2</sup> and to enable the development of a long term transport investment programme for the North. This will mean that TfN and its Partners can work with Government to secure funding to deliver the right schemes in the right place at the right time, providing certainty for local transport authorities to plan complementary investment and also for the private sector to plan commercial investments. The pipeline of investment will give confidence to businesses across the North to invest and grow, give the supply chain, including Small to Medium Enterprises (SMEs), confidence to plan interventions, build up their skills base, and collaborate across industries.
- 1.3 Building on existing and proposed projects, the Strategic Development Corridors (SDCs) represent strategic geographical and economic areas with the strongest potential towards transformational growth in the North. Combining evidence from the 2017 Integrated Rail and Major Roads Reports, the STP identifies seven corridors (see Figure 1) where evidence indicates delivery of transformational growth is dependent on bringing forward major road and rail investment.
- 1.4 These corridors complement Northern Powerhouse Rail (NPR), Integrated and Smart Travel and three Strategic Road studies<sup>3</sup>, which form part of the reference case for this study. This study specifically seeks to explore the Central Pennines Strategic Development Corridor (SDC).

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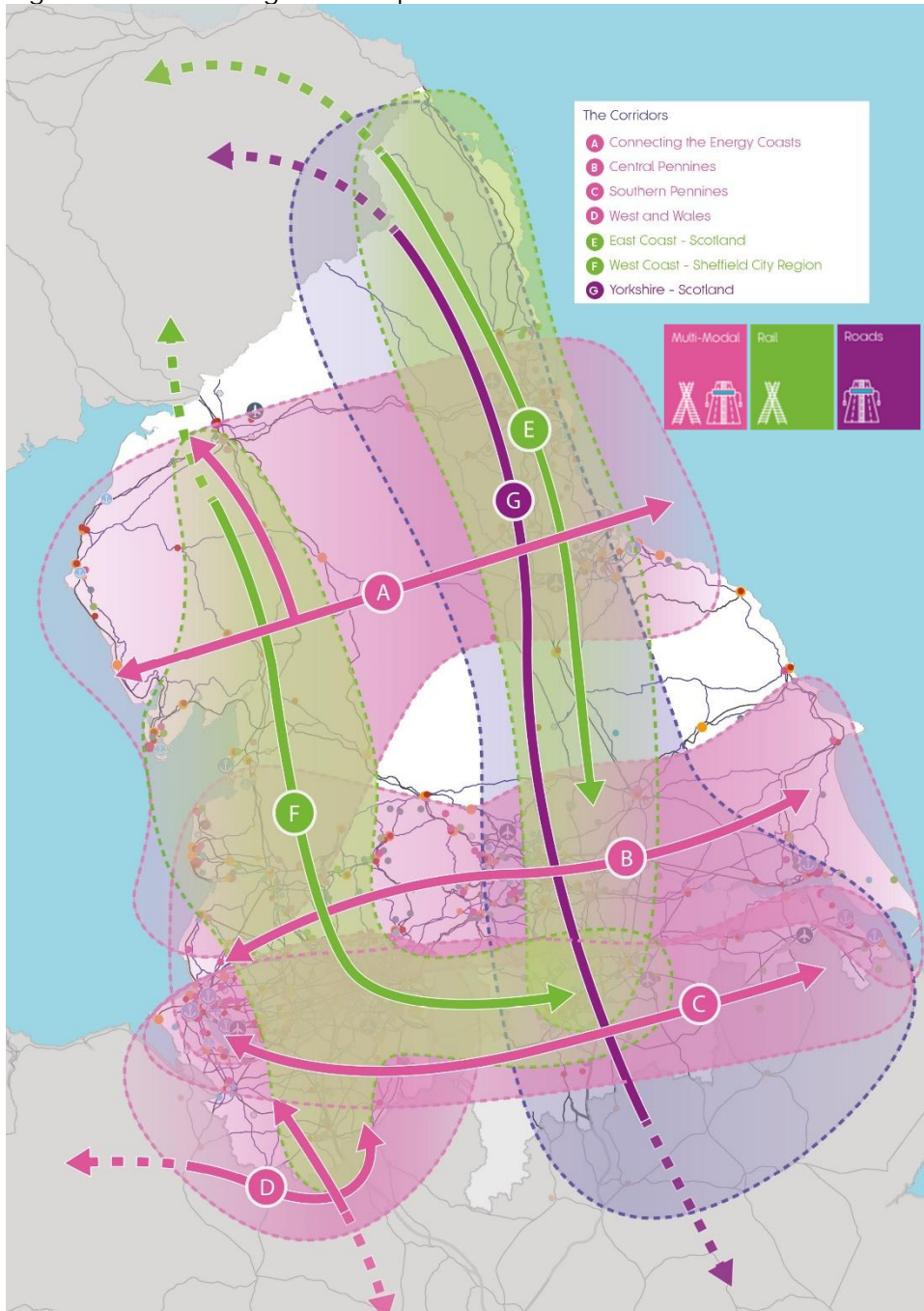
<sup>1</sup> Strategic Transport Plan for the North (Final)

<sup>2</sup> <https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf>

<sup>3</sup> Northern Trans Pennine Routes; Manchester North West Quadrant; Trans Pennine Tunnel



Figure 1: TfN Strategic Development Corridors



Source: TfN Strategic Transport Plan

- 1.5 The SDCs have been developed to represent where most of the largest gaps between demand and performance currently exist, and where there is likely to be the greatest economic potential to improve connectivity and the economic interaction between the existing key economic clusters and assets of the North and facilitate potential future clusters in other locations. Investment considered within the context of these corridors is focused on interventions that will benefit the whole of the North. Acknowledging the possibility that locations of demand and investment priorities may change over time with land use decisions and market responses, which will be

informed by future iterations of the STP. The study does not consider interventions with a predominantly local impact.

## Transport for the North

- 1.6 TfN is the voice of the North of England for transport; a statutory body of elected leaders and a partnership of business leaders from across the whole of the North of England who collectively represent all of the region's 16 million citizens.
- 1.7 Alongside local political Leaders, TfN's Board also has representatives from the national transport bodies (Network Rail, Highways England and HS2 Ltd) and works closely with its neighbours in Wales, Scotland and the Midlands.
- 1.8 TfN's vision is of *"a thriving North of England where world class transport supports sustainable economic growth and improved opportunities for all"*. As England's first Sub-National Transport Body, TfN was established to transform the transport system across the North of England. It has a clear remit to plan the transport infrastructure required to support transformational economic growth in the North.
- 1.9 The statutory powers that have been granted allow and require TfN to:
  - Develop and implement a STP for the North of England.
  - Act as 'one voice' for the North, clearly communicating Pan-Northern priorities to the Secretary of State for Transport.
  - Coordinate and deliver smart ticketing systems across the North.
  - Become a statutory partner in rail and road investment decisions, through the Rail North Partnership and Highways North Board.
  - Oversee (jointly with the Department for Transport) franchised rail services covering Northern and TransPennine Express franchises.
  - Promote highways improvements of Northern significance, with the agreement of Government and relevant highway and local authorities.
  - Decide on capital grants.
- 1.10 Complementing the work of existing local transport authorities and with powers devolved down from central government rather than up from local government, TfN's role is to add value, ensuring that funding and strategic decisions about transport in the North are informed by local knowledge, expertise and requirements.
- 1.11 A vision of a transformed North was set out in the NPIER. It concluded that transformational growth will require investment and improved performance in a number of critical areas, especially education, skills, innovation and inward investment, alongside improved transport infrastructure and services for passengers and freight.
- 1.12 The NPIER also established that a transformed North could see an additional 850,000 jobs and almost £100 billion additional Gross Value Added (GVA), over and above 'business as usual' trends, by 2050.

- 1.13 It is crucial that the productivity gap which currently holds back growth in the North is reduced, to ensure that all of the North performs as well as the rest of the UK. A step-change in strategic transport infrastructure investment is a vital enabler to achieve the North’s economic aspirations – establishing a value-for-money investment programme, within an ambitious, but realistic, funding envelope, is TfN’s primary responsibility.

### Definition of Pan-Northern

- 1.14 TfN has gone some way to defining what is meant by the term ‘Pan-Northern’. A key component of this is subsidiarity; pursuing governance and decision making at a local level, whilst accounting for the appropriate scale of organisation required to exercise powers at a regional (for example, Pan-Northern) level.

#### The Definition of Pan-Northern

*Why? “Facilitate and enable transformational growth of the economy through improved connectivity for people, businesses and goods to, from and within the North.”*

How this will be achieved:

- By enhancing the North’s major transport networks to operate more efficiently and more reliably and to increase network resilience
- Supporting, informing and influencing present and future land-use development
- Promoting and supporting the built and natural environment
- Supporting the reduction of transport-related carbon emissions and contributing to improvement of air quality
- Ensuring proposed transport interventions offer value for money
- Improving journey time, quality and choice

- 1.15 It flows from this principle that TfN is the appropriate level at which to take transport decisions impacting across geographies in the North, whilst local authorities are the appropriate level at which to take transport decisions that are contained within a locality in the North and where investment is not necessarily driven by Pan-Northern aspirations. ‘Pan-Northern’ is a short-hand, encompassing, definition which refers to transport schemes that naturally fit within TfN’s remit.

### The rationale for Strategic Development Corridors

- 1.16 Interventions considered within the SDC programmes are complementary to the two Strategic Road projects, one ongoing Strategic Road Study, NPR, and other committed improvements, which are included within the ‘reference case’ for this study. Ultimately all schemes identified in this SDC study are aimed at supporting TfN’s objectives, including transformational growth in the North. However not every scheme will transform the transport system in its own right. Investment in the SDCs, in addition to the schemes included in the reference case, is required to:

- Maximise/enhance the benefits of reference case schemes

- Distribute the benefits of the North's 'major transformational-infrastructure projects<sup>4</sup>' for example through improving connectivity to the NPR/HS2 gateways
- Achieve early benefits of Pan-Northern transport investment through identifying potential short, medium and long-term interventions within the programme
- Fill gaps in TfN's wider programme, targeted at the corridors where the greatest potential to unlock transformational economic growth and contribute to the other key STP objectives (such as improving efficiency, inclusivity and the environment), has been identified.

1.17 The SDCs, including technical and overall governance arrangements, have been developed and delivered by partners and stakeholders as detailed in Option Assessment Process and Management Dimension.

### The Central Pennines SDC

1.18 The Central Pennines SDC is an east-west corridor encompassing some of the North's important economic centres and assets in North Yorkshire, West Yorkshire, East Riding and Hull and Humber through to Greater Manchester, Lancashire and Liverpool City Region.

1.19 This corridor has some of the North's key economic and population centres, with a diverse mix of strategic movements. It is home to approximately 8.7 million people, accommodating over 4 million jobs which generate between 40-50% of the North's economic output.

1.20 Economies within the Central Pennines face a variety of economic challenges including:

- Low productivity performance attributed to a historic decline in manufacturing, particularly the case, for example in Lancashire, which has a rich industrial heritage, and a reliance on primary industries in North Yorkshire, East Riding and the Humber;
- An over-reliance on the public sector, for example in the Liverpool City Region and Hull & the Humber, and limited presence in high value sectors in some areas, including in York, North Yorkshire and East Riding; and
- Lower levels of business innovation and exporting, and lower proportions of higher-level occupations, as is the case in the Leeds City Region, despite its productivity performance faring above average compared to the rest of the North.

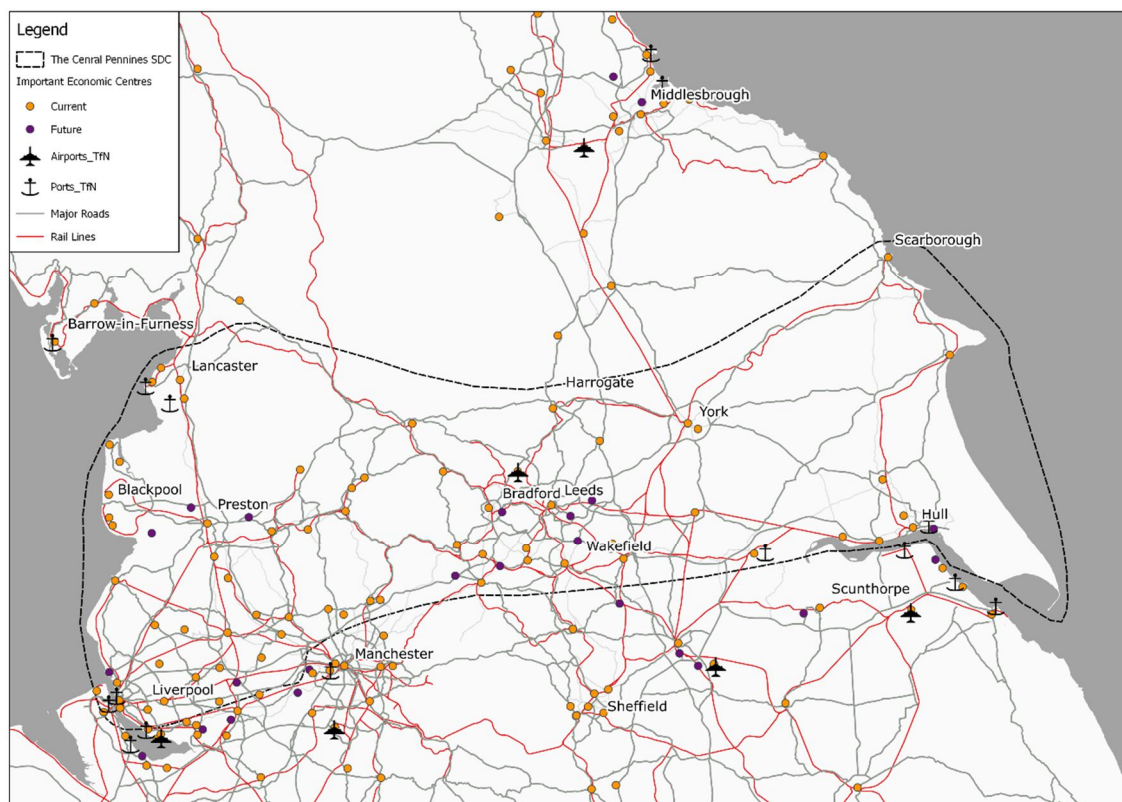
1.21 With enhanced strategic connectivity, there is the potential to uncap the significant economic growth potential. Addressing east-west connectivity is a priority and a failure to address current connectivity constraints would critically restrict the transformational growth potential of this corridor and the wider Northern economy. The role of key north-south links connecting

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<sup>4</sup> The three ongoing Strategic Road Studies, Northern Powerhouse Rail

into and between the east-west routes is also vital to a fully integrated and functional economic region.

Figure 2 Central Pennines SDC Study Area



## Scope of Strategic Development Corridor SPOC

- 1.22 The TfN SDC business cases have been developed to a level of detail approaching a conventional ‘single-scheme’ Strategic Outline Business Case (SOBC)<sup>5</sup>, but greater than a Strategic Outline Programme (SOP). To distinguish them from these two documents defined in HM Treasury (HMT) and Department for Transport (DfT) guidance, they have given the description of Strategic Programme Outline Case (SPOC).
- 1.23 TfN’s vision for its SDC business cases is that they demonstrate the justification for a sequenced programme of interventions within the context

<sup>5</sup> DfT guidance uses SOBC whereas more recent Treasury guidance uses Strategic Outline Case (SOC) for the equivalent development stage for interventions with a single approval

of the NPIER and transformational economic growth. The business case documents seek funding commitment sufficient to progress development of early sequence interventions and to further refine the overall programme.

- 1.24 Funding approvals for interventions within the SDC programmes will be sought through the UK public sector’s staged approach to major investment decisions as shown for transport projects in Figure 3.

Figure 3: The Three Phases of the Decision Making Process



Source: DfT Transport Business Cases

- 1.25 Fundamental to this process is the need for procurement activity to be complete before finalisation of the Full Business Case (FBC) and all required contracts entered shortly after an affirmative final investment decision. Business cases will be developed for interventions within the SDC individually or in packages of interventions sufficiently similar or related that they can be procured together.
- 1.26 It follows that the SDC programme of varied and wide-ranging interventions sequenced over an extended time horizon could not directly follow the above process. However, there are interdependencies and synergies between interventions within and between the SDCs which mean that the case for individual interventions would not represent its contribution to the whole package. For example, an early intervention may not deliver its full potential benefits until later interventions in the programme have been delivered.
- 1.27 HMT public sector business case guidance<sup>6</sup> describes a SOP Business Case content specified to be appropriate to a programme of interventions, but at an early stage and with a relatively low level of detail, particularly in terms of Value for Money (VfM) appraisal.

<sup>6</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/469317/green\\_book\\_guidance\\_public\\_sector\\_business\\_cases\\_2\\_015\\_update.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/469317/green_book_guidance_public_sector_business_cases_2_015_update.pdf) (Oct 2015)

## Structure of SPOC

- 1.28 The TfN SPOCs have been developed with reference to the HMT Green Book<sup>7</sup> and DfT<sup>8</sup> and HMT business case guidance<sup>6</sup>. The 2018 update to the HMT Green Book has moved to describing the five main content sections of a public-sector business case as 'dimensions'; previously these were known as cases. TfN's SDC SPOCs follow this change in convention, being structured as follows:
- An Introduction comprising chapter 1
  - The Strategic Dimension comprising chapters 2 to 7
  - The Economic Dimension comprising chapters 8 to 15
  - The Financial Dimension comprising chapters 16 to 18
  - The Commercial Dimension comprising chapters 19 to 21
  - The Management Dimension comprising chapters 22 to 28
  - Glossary comprising chapter 28
- 1.29 Each of the five business case dimensions opens with an explanation of its underlying purpose, followed by the key messages from that dimension. Each of the five dimensions closes with a summary. For the Economic Dimension, the summary is provided in the form of a VfM statement which follows the approach set out in DfT's VfM Framework document. Each SPOC is accompanied by a standalone non-technical summary document.

## Supporting Documents

- 1.30 A standalone Executive Summary has been published separately.
- 1.31 Further detailed evidence is available on TfN's website at: [www.transportforthenorth.com](http://www.transportforthenorth.com)

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf) (March 2018)

<sup>8</sup> DfT:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/85930/dft-transport-business-case.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf) (January 2013)

# Strategic Dimension

The Strategic Dimension of a business case sets out to demonstrate:

- That to achieve rational aims, there are problems that need to be solved and opportunities that need to be taken (the case for change)
- That transport investment (including in technology solutions) is an appropriate way to deliver that change and that TfN is the appropriate promoter (the need for intervention)
- That an appropriately broad approach has been taken to identifying interventions and a robust approach taken to shortlisting (the option assessment process)
- That constraints, interdependencies and the needs/capabilities/views of stakeholders have been identified and taken into consideration in selecting a way forward (the wider context)

## 2 Introduction

### Background

- 2.1 The Strategic Dimension sets out the robust case for change, which underlies the proposed programme of interventions for the Central Pennines Strategic Development Corridor (SDC), and how it fits with wider policy objectives. It goes on to summarise the need for intervention, which justifies (TfN) promoting strategic transport interventions, drawing this evidence together in identifying a set of objectives specific to the SDC.
- 2.2 The Strategic Dimension goes on to explain key elements of the wider context and summarises the process through which an SDC Programme, tested against different levels of demand growth, has been developed.
- 2.3 The Strategic Dimension has been developed with reference to HM Treasury<sup>6</sup> (HMT) and Department for Transport<sup>8</sup> (DfT) business case guidance. It has drawn on DfT Supplementary Strategic Case Guidance, with respect to its *Transport Investment Strategy*<sup>9</sup> and Rebalancing Toolkit<sup>10</sup>.

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/669041/strategic-case-supplementary-guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669041/strategic-case-supplementary-guidance.pdf) (December 2017)

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf) (December 2017)



## Policy Context

- 2.4 The UK Government, as well as regional and local authorities, have identified the need for investing in strategic infrastructure to improve the country's productivity and increase economic growth and overall wellbeing in a way that is socially and environmentally responsible. In addition, the need for rebalancing the economy and shifting away from targeting purely 'net national' impacts has become increasingly important. This need to create an economy that works for everyone and every region has been highlighted in several national, regional and local policies. Infrastructure projects and changes delivered to stimulate the economic development of the Central Pennines SDC needs to consider these policies to ensure consistency with the wider national framework and other infrastructure initiatives.

### National Policy

- 2.5 At a national level, the Government's Industrial and Transport Investment strategies outline the need to actively support the UK's long-term productivity and economic development through strategic infrastructure projects and investments<sup>11,12</sup>.
- 2.6 The *Industrial Strategy* sets the overall objective of creating an economy that boosts productivity and earning power throughout the entire UK. It identifies five main foundations of productivity:
- Ideas – 'the world's most innovative economy'
  - People – 'good jobs and greater earning power for all'
  - Infrastructure – 'a major upgrade to the UK's infrastructure'
  - Business Environment – 'the best places to start and grow a business'
  - Places – 'prosperous communities across the UK'
- 2.7 Improved infrastructure plays a key role in the Industrial Strategy, as the need for better connectivity to link up people and markets to attract investment has been highlighted. To stimulate more inclusive economic growth through transport investments, the strategy also takes greater account of regional imbalances to ensure that growth can be achieved across all regions in the UK.

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<sup>11</sup> HM Government, *UK Industrial Strategy*  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf)

<sup>12</sup> Department for Transport, *Transport Investment Strategy* (2017)  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/624990/transport-investment-strategy-web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624990/transport-investment-strategy-web.pdf)

2.8 DfT’s *Transport Investment Strategy*<sup>13</sup> is closely aligned with the Industrial Strategy. The key objectives of the Transport Investment Strategy are shown in Table 1.

Table 1 Transport Investment Strategy Objectives

Objective	Challenge
Create a more reliable, less congested, and better-connected transport network that works for the users who rely on it	Current transport networks have become increasingly out-of-date and experience increasing demand, causing delays and less reliability. In many places the transport network does not provide the connections people and businesses need.
Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities	UK productivity lags behind other developed countries and prosperity and benefits haven’t been shared evenly between different regions, leaving some communities being left behind.
Enhance the global competitiveness by making Britain a more attractive place to trade and invest	The long-term success in a globalised world will depend on the UK’s ability to attract job creating investment, enhance the country’s industrial strengths and enhance global trade.
Support the creation of new housing	Transport infrastructure is considered as one of the keys to unlocking development and delivering places people want to live.

2.9 The necessity for improved transport links is also highlighted in the ‘*Making our Economy Work for Everyone*’ report by the Inclusive Growth Commission<sup>14</sup>. This report outlines that connecting people to economic assets and opportunities needs to be a key priority to enable inclusive economic growth. The report also states that investment in social infrastructure is required indicating the necessity for building transport and

<sup>13</sup> Department for Transport, *Transport Investment Strategy* (2017) [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/624990/transport-investment-strategy-web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624990/transport-investment-strategy-web.pdf)

<sup>14</sup> Inclusive Growth Commission, *Making our Economy Work for Everyone* (2017) [https://www.thersa.org/globalassets/pdfs/reports/rsa\\_inclusive-growth-commission-final-report-march-2017.pdf](https://www.thersa.org/globalassets/pdfs/reports/rsa_inclusive-growth-commission-final-report-march-2017.pdf)

economic connectivity for regions and places which were previously disadvantaged due to poor transport links.

- 2.10 The DfT's Local Transport White Paper: *Creating Growth, Cutting Carbon: Making Sustainable Transport Happen*<sup>15</sup> vision is "...for a transport system that is an engine for economic growth, but one that is also greener and safer and improves quality of life in our communities". The key objectives identified by the White Paper are to encourage economic growth, reduce carbon emissions and encourage the wider objectives of transport (such as more physical activity, improved road safety and air quality). Similar references to socially and environmentally responsible economic growth are included in the UK Industrial Strategy.
- 2.11 The Ministry of Housing, Communities and Local Government's 2018 draft *National Planning and Policy Framework*<sup>16</sup> sets out the need for sustainable development that has three overarching objectives: economic, social and environmental. The framework identifies the need for significant weight to be placed on supporting economic growth and productivity but states that opportunities should be taken to secure net gains across the three objectives.

#### Regional Policy

- 2.12 At the regional level, the aspiration of improving the country's productivity and economic development through improved transport links is emphasised in different policy documents. The *Strategic Transport Plan*<sup>17</sup> (STP) published by TfN in 2018 has a clear vision of "connecting and growing the economy of the North of England". This vision is supported by key Pan-Northern transport objectives:

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<sup>15</sup> DfT *Local Transport White paper: Creating Growth, Cutting Carbon: Making Sustainable Transport Happen* (2011)  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/3890/making-sustainable-local-transport-happen-whitepaper.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3890/making-sustainable-local-transport-happen-whitepaper.pdf)

<sup>16</sup> Ministry of Housing, Communities and Local Government, *draft National Planning and Policy Framework* (2018)  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685289/Draft\\_revised\\_National\\_Planning\\_Policy\\_Framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685289/Draft_revised_National_Planning_Policy_Framework.pdf)

<sup>17</sup> Transport for the North, *Strategic Transport Plan* (2018)  
[https://transportforthenorth.com/wp-content/uploads/TfN-Strategic-Plan\\_draft\\_lr.pdf](https://transportforthenorth.com/wp-content/uploads/TfN-Strategic-Plan_draft_lr.pdf)

Figure 4: TfN's Key Pan-Northern Objectives



- 2.13 The STP identifies seven SDCs (based on the 2017 Integrated Rail and Major Roads Reports), including the Central Pennines SDC, as shown in Chapter 1. These corridors are representative of where evidence indicates delivery of transformational growth is dependent on bringing forward major road and rail investment.
- 2.14 Through the Northern Powerhouse Independent Economic Review (NPIER), transport investment has been shown to be a key enabler for growth in the North's economy. In short, transport has three main roles that can help support the North's existing and future economic assets and clusters:
- Connecting people - improving access to work opportunities, giving businesses access to a wider labour market, and improving access to leisure and tourism assets.
  - Connecting businesses - improving connections to collaborators, clients and competitors, including those within the prime and enabling capabilities.
  - Moving goods - supporting businesses to move freight and goods in efficient, multi-modal ways.
- 2.15 Collectively, these three roles provide the key aims of the STP for the North, and will be achieved through improved:
- Connectivity between the North's economic assets and clusters;
  - Multi-modal connectivity improvements;
  - Delivering nationally significant infrastructure projects, major employment and major local development approvals;
  - Cross-border connectivity with the North's economic neighbours; and
  - Supporting the international connectivity of the North.

- 2.16 The STP is closely aligned with the “*One North*” report published in 2014<sup>18</sup>, which first set out the vision for a Northern Powerhouse. One North highlights the need for a new strategic approach to connect the cities of the North to support improvements in economic performance. The outlined approach emphasises the necessity for improving connectivity to maximise economic growth in the North. The STP envisions a highly interconnected and integrated region of thriving cities, acting as a valuable counterweight and complement to London.
- 2.17 The need for better connectivity and closer collaboration in the North is also demonstrated by the NPIER<sup>19</sup> published in 2016. The NPIER outlines the performance gap between the North and the rest of the UK with respect to productivity and identifies the lack of agglomeration, poor connectivity and transport links as key factors (among others) that hinder the economic development of the North. The NPIER concludes that improved connectivity between key settlements can help to:
- promote a higher employment rate, by improving access to centres of employment
  - promote higher productivity, by improving access to markets
  - increase the pool of workers available to work in higher productivity urban locations
  - increase the effective scale of cities and the associated benefits of agglomeration
- 2.18 The NPIER set out a bold vision of economic transformation for the North that will rebalance the UK economy and increase international competitiveness. It articulates the vision of a transformed North and concluded that improving economic performance in the North could bring significant benefits for the UK economy by 2050 of:
- £92 billion (15%) increase in Gross Value Added (GVA) (the measure of the value of goods and services produced in an area, industry or sector of an economy)
  - 850,000 additional jobs
  - 4% higher productivity than in a business as usual scenario.
- 2.19 This uneven development between different regions within the UK and the need for rebalancing the UK economy is also the focus of the ‘Rebalancing Toolkit’ developed by the DfT<sup>20</sup>. This toolkit is designed to help authors of

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<sup>18</sup>Transport for the North, *The Northern Powerhouse: One Agenda, One Economy, One North* (2015) <https://www.transportfornorth.com/wp-content/uploads/A-report-on-the-Northern-Transport-Strategy-1.pdf>

<sup>19</sup> Transport for the North, *The Northern Powerhouse Independent Economic Review* (2016) <https://transportfornorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf>

<sup>20</sup> Department for Transport, *Strategic Case Supplementary Guidance Rebalancing Toolkit* (2017)

strategic cases assess how a project fits with the objective of spreading growth across the whole country.

- 2.20 The Northern Freight and Logistics Report<sup>21</sup> identifies the need for better connectivity with respect to freight and logistics. The report sets out the overall objective: *“Maximise the efficiency of the movement of goods to, from and within the North of England to contribute to the transformation of the economy of the Northern Powerhouse”*.

#### Local Policy

- 2.21 At a local level, strategies and policies have been developed within the Central Pennines SDC corridor that support the overall goal of improving transport infrastructure and stimulating sustainable and inclusive economic growth, within the context of the need to address the north-south productivity gap and contribution towards a Northern Powerhouse, including:
- The *Greater Manchester Transport Strategy 2040*<sup>22</sup> sees Greater Manchester at the heart of a globalised Northern Powerhouse economy with an increasingly skilled workforce, competing on the global stage to attract investment, businesses, workers and tourists. It highlights the need for high class connections that support long-term, sustainable economic growth and access to opportunity for all;
  - A *Transport Plan for Growth*<sup>23</sup> by the Liverpool City Region Combined Authority is aligned with the Government's high-level economic policy drivers of localism, devolution of power and growth. It sets out the City Region's strategic direction for increased transport investments to support economic growth, regeneration and carbon reduction. Freight and logistics, employment and skills as well as strengthening the visitor economy are also key elements of the strategy;
  - The *Lancashire Strategic Transport Prospectus*<sup>24</sup> (Lancashire Local Enterprise Partnership (LEP), 2016) identifies its long term strategic transport requirements as part of an interconnected and productive Northern Powerhouse, highlighting the opportunities and constraints on

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf)

<sup>21</sup> Transport for the North, *Northern Freight and Logistics Report* (201X)  
<https://www.transportforthenorth.com/wp-content/uploads/TfN-Freight-and-Logistics-Report.pdf>

<sup>22</sup>Transport for Greater Manchester, *Greater Manchester Transport Strategy 2040* (2017)  
[https://assets.ctfassets.net/nv7y93idf4jq/5NBNSoWRZS8AkcGkAU4CEg/f2dfea7defcc0699b2a11c7219b5254d/17-0663\\_GM\\_2040\\_Exec\\_summary.pdf](https://assets.ctfassets.net/nv7y93idf4jq/5NBNSoWRZS8AkcGkAU4CEg/f2dfea7defcc0699b2a11c7219b5254d/17-0663_GM_2040_Exec_summary.pdf)

<sup>23</sup> Liverpool City Region Combined Authority, *A Transport Plan for Growth* (Year)  
<https://www.merseytravel.gov.uk/about-us/local-transport-delivery/Documents/8375%20Plan%20for%20growth%20WEB%20FINAL.pdf>

<sup>24</sup> The Lancashire Strategic Transport Prospectus  
[http://www.lancashirelep.co.uk/media/26203/4412-lancs-strat-transport\\_web.pdf](http://www.lancashirelep.co.uk/media/26203/4412-lancs-strat-transport_web.pdf)

growth over the next twenty years, as well as the more immediate interventions needed to stimulate Lancashire's latent potential;

- The *West Yorkshire Combined Authority Transport Strategy 2040*<sup>25</sup> sets out its vision to enhance business success and people's lives by providing modern, world-class, well-connected transport that makes travel around West Yorkshire easy and reliable;
- A *Strategic Transport Prospectus for North Yorkshire*<sup>26</sup> sets out how the County Council would like to work with the Government, TfN and the Northern City Regions to ensure that improved transport connections allow England's largest County to both contribute to and share in the economic benefits of the Northern Powerhouse. It highlights that linking the economies of the city regions of the North will undoubtedly bring great economic benefits and hopefully create a powerhouse to rival London, but cautions there are important 'Places In Between' - North Yorkshire is one of those.

2.22 Generally speaking, in Pan-Northern terms local policy recognises the benefits of well-developed north-south transport corridors, principally through the West & East Coast Main Lines and M1 & M6 motorways, but highlights that long term under investment in east-west connectivity has the potential to stifle growth in the economy of many of the LEP regions in this Corridor. These issues are highlighted in the *Central Trans-Pennine Corridor East-West Connectivity: Economic Study (2017)*<sup>27</sup> commissioned through Transport for Lancashire on behalf of the Lancashire LEP, in conjunction with partners in North and West Yorkshire.

2.23 Similar findings and conclusions are replayed in many studies including the 1995 academic research paper *Transport in the Trans-Pennine Corridor: Present Conditions and Future (Interregional Study Working Paper 3)* prepared by the University of Leeds Institute for Transport Studies and managed by TransPennine Ltd on behalf of the former Regional Associations for the North West and Yorkshire and Humberside.

## The Reference Case

2.24 The Government is already funding a significant programme of transport interventions across the North. In addition, further investment is being planned by both central Government and local bodies. This includes road investment schemes put forward by Highways England, transport schemes developed by combined and local authorities across the North, Pan-

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<sup>25</sup> West Yorkshire Transport Strategy 2040 (2017) <https://www.westyorks-ca.gov.uk/media/2664/transport-strategy-2040.pdf>

<sup>26</sup> A Strategic Transport Prospectus for North Yorkshire [https://www.northyorks.gov.uk/sites/default/files/fileroot/About%20the%20Council/Strategies%2C%20plans%20and%20policies/A\\_strategic\\_transport\\_prospectus\\_for\\_North\\_Yorkshire.pdf](https://www.northyorks.gov.uk/sites/default/files/fileroot/About%20the%20Council/Strategies%2C%20plans%20and%20policies/A_strategic_transport_prospectus_for_North_Yorkshire.pdf)

<sup>27</sup> Central Trans-Pennine Corridor East-West Connectivity Study (2017) <http://council.lancashire.gov.uk/documents/s109483/Central%20Trans-Pennine%20Corridor%20East%20West%20Connectivity%20Study.pdf>

Northern schemes such as NPR being developed by TfN, and HS2, led by Central Government. Figure 5 illustrates the HS2 (Phases 1, 2a and 2b) and the Northern Powerhouse Rail (NPR) reference case. Combined these will transform journey times and service frequencies between the North's largest cities and to London, Birmingham and the Midlands. It is therefore expected that significant investment in new transport infrastructure will be delivered in the coming decades to address connectivity challenges of the current transport system.

Figure 5: Emerging vision for the Northern Powerhouse Rail Network



Source: TfN Strategic Transport Plan



- 2.25 In this context, a Reference Case, considered to be a 'do-minimum' scenario, has been developed by TfN which includes both committed schemes and non-committed strategic interventions that can be reasonably expected to be delivered in the medium and long term and are necessary to achieve the North's economic growth aspirations.
- 2.26 For the purposes of this study, the Transport Appraisal Guidance (WebTAG) definition of reasonably foreseeable has been extended for the SDCs to include any strategic intervention that is at Strategic Outline Business Case (SOBC) stage or equivalent, including interventions without an identified funding route. Post 2027 the reference case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations.

Table 2 Reference case parameters and assumptions

2020-2027	Post 2027
STP 'baseline investment assumptions' will be included in the Reference Case (already been confirmed by Highways England, Network Rail and DfT as committed).	Reference Case includes other work programmes identified by the STP as necessary to achieve the North's economic growth aspirations; HS2, NPR, Northern Trans-Pennine Routes, Trans-Pennine Tunnel & Wider Transport Connectivity Assessment and Manchester North West Quadrant.
Interventions identified by the SDC consultants and TfN as being 'reasonably foreseeable'.	Reference Case should be developed to ensure a 'do-minimum' standard within the transport model is represented.
WebTAG definition of reasonably foreseeable has been extended for the SDCs to include any strategic intervention that is at SOBC stage or equivalent, including those without an identified funding route.	
Expect to include interventions within Highways England's Road Investment Strategy and Network Rail's Enhancements Delivery Plan	

- 2.27 For a full list of interventions covered by the reference case for the Central Pennines SDC, see Table 3.

Table 3 Reference Case: List of interventions (Road/Rail)

Road	Rail
<ul style="list-style-type: none"> <li>• Road Investment Strategy 1: north-south improvements on the M6</li> <li>• Road Investment Strategy 1: east-west improvements on the M62</li> <li>• M1/M62 Lofthouse Interchange</li> <li>• A1(M) Junction 47</li> <li>• A1237 York Northern Outer Ring Road Phase 1</li> <li>• A1079/ A164 Jock’s Lodge junction</li> <li>• A64 Hopgrove Junction to Barton Hill</li> <li>• M60/M62/M66 Simister Island</li> <li>• M62 Junctions 26 to 27 including improvements to the M62/M606 Chain Bar junction</li> <li>• Trans Pennine Tunnel and wider connectivity improvements</li> <li>• Manchester North West Quadrant SRN and multi-modal enhancements</li> <li>• Leeds Bradford Airport Link Road</li> <li>• A5036 Princess Way</li> <li>• A63 Castle Street</li> <li>• A63 Garrison Road roundabout</li> <li>• A585 Windy Harbour – Skippool</li> <li>• M55 Junction 3 roundabout signalisation</li> <li>• A585 Norcross junction improvement</li> <li>• M65 Hyndburn-Pendle Growth Corridor junction improvements</li> <li>• A650 Hard Ings Road</li> <li>• Bradford Shipley Corridor improvements</li> <li>• Improved links between Western Gateway Canal Crossing, Port Salford and M60 between Junctions 10 and 11 and improvements to the M60 between Junctions 9 and 10 and 11 and 12</li> <li>• M6 / M58 &amp; A49 Wigan Link Roads</li> <li>• A582 Preston Western Distributor</li> <li>• A582 South Ribble Western Distributor</li> <li>• M62 Junction 6</li> <li>• M6 Junction 33 Link Roads</li> </ul>	<ul style="list-style-type: none"> <li>• HS2 Phases 2a and 2b including all necessary station works to accommodate services at Preston station, Wigan North Western station and Lancaster station</li> <li>• Northern Powerhouse Rail</li> <li>• Interventions at the major hubs necessary to realise the benefits of improved connectivity along the NPR corridors, including in the Central Pennines SDC: York, Manchester Piccadilly, Liverpool Lime Street and the Leeds Station Masterplans</li> <li>• West Coast Main line – Wigan and Preston to Scotland (journey time and capacity improvements)</li> <li>• TransPennine Route Upgrade (including Intermediate Interventions)</li> <li>• Blackpool Tramway Extension</li> <li>• Northern and TransPennine Express franchises</li> <li>• Liverpool Central Station</li> <li>• Manchester – Preston improvements</li> <li>• Liverpool City Region upgrades</li> <li>• Calder Valley Line upgrade</li> <li>• Cross Manchester Capacity and Reliability</li> </ul>

2.28 The programme of interventions put forward within this Strategic Programme Outline Case (SPOC) has been developed to maximise the overall benefits of the schemes in the Reference Case and to improve the spatial distribution of benefits.

### Structure of Strategic Dimension

2.29 The remainder of the Strategic Dimension of this SPOC is structured as follows:

- Chapter 3 sets out the Case for Change which is the foundation for the programme of interventions justified within this business case
- Chapter 4 outlines the Need for Intervention and identifies SDC objectives
- Chapter 5 explains the wider context with influence on the deliverability of the programme and the interventions within it
- Chapter 6 summarises the option assessment process which identified interventions within the SDC
- Chapter 7 summarises the findings of the Strategic Dimension

## 3 The Case for Change

### Introduction

- 3.1 This chapter sets out the Case for Change which underlies the justification for strategic investment in the Central Pennines development corridor. Fundamentally, transport investment infrastructure is required to support transformational growth in the North which in turn increases the potential for national economic growth.
- 3.2 The Case for Change is based on identifying problems which need to be solved and opportunities which need to be taken to allow and support growth in the North's economy.

### Need for growth in the North's economy

- 3.3 The North is home to 515,000 businesses, more than 6.8 million jobs, and over 15 million people, with population growth of 6.7% over the last 20 years.
- 3.4 The North has a wealth of high-profile, growing UK-wide and international businesses, and a long history of innovation, utilising the rich and diverse set of assets and talent to support national growth. Over the last decade businesses and employees across the North have generated an additional £65 billion (25%) to the UK economy. Today the North is the second most productive region in the UK in absolute terms, with a total economic contribution of over £332 billion, 19% of the UK's total.
- 3.5 However, while some individual economies of the city regions of the North have experienced strong economic progress, the North as a region lags behind London and the South East with respect to its economic performance. A significant and widening performance gap between the North and the rest of the UK has become evident and will continue to grow unless action is taken to reverse this trend.
- 3.6 Investment in transport infrastructure is required to support transformational growth in the North and subsequently increase the potential for national economic growth due to:
  - The size of the North's economy: being the second most productive region in the UK in absolute terms demonstrates the North's importance to national productivity.
  - Poor productivity performance: When considered on a GVA per hour worked basis the North's productivity level is 88% of the UK average. The North also performs poorly when productivity is measured on a GVA per worker or per capita basis and this productivity gap is growing.

- A need to invest in and support the NPIER Prime and Enabling Capabilities<sup>28</sup>; The Capabilities are key differentiators of the North's economy on an international level, which are highly productive and capable of competing on national and international stages. Support for these capabilities is required to achieve the ambition for transformational growth.
- Transport infrastructure's contribution to economic growth; Transport can contribute to achieving transformational growth particularly through agglomeration, labour market expansion, connectivity to global markets and encouraging skills investment.

3.7 The success of the UK in the global marketplace and the success of the Government's Northern Powerhouse Strategy and Industrial Strategy depends upon transforming the economy of the North.

#### Central Pennines SDC's contribution to the North's Economy

3.8 The Central Pennines SDC is an east-west corridor encompassing some of the North's important economic centres and assets in North Yorkshire, West Yorkshire, East Riding and Hull and Humber through to Greater Manchester, Lancashire and Liverpool City Region. This corridor has some of the North's key economic and population centres, with a diverse mix of strategic movements. It is home to approximately 8.7 million people, accommodating over 4 million jobs which generate between 40-45% of the North's annual GVA.

3.9 It contains some of the most populated centres of the North of England, including Leeds City Region and Liverpool City Region. The Corridor has an important relationship with Greater Manchester, as it is through this Metropolitan County that the movement of goods and people between the east and west largely occurs (due to the existing east-west transport infrastructure). The economies in the study area play a key role in the economic growth of the North of England.

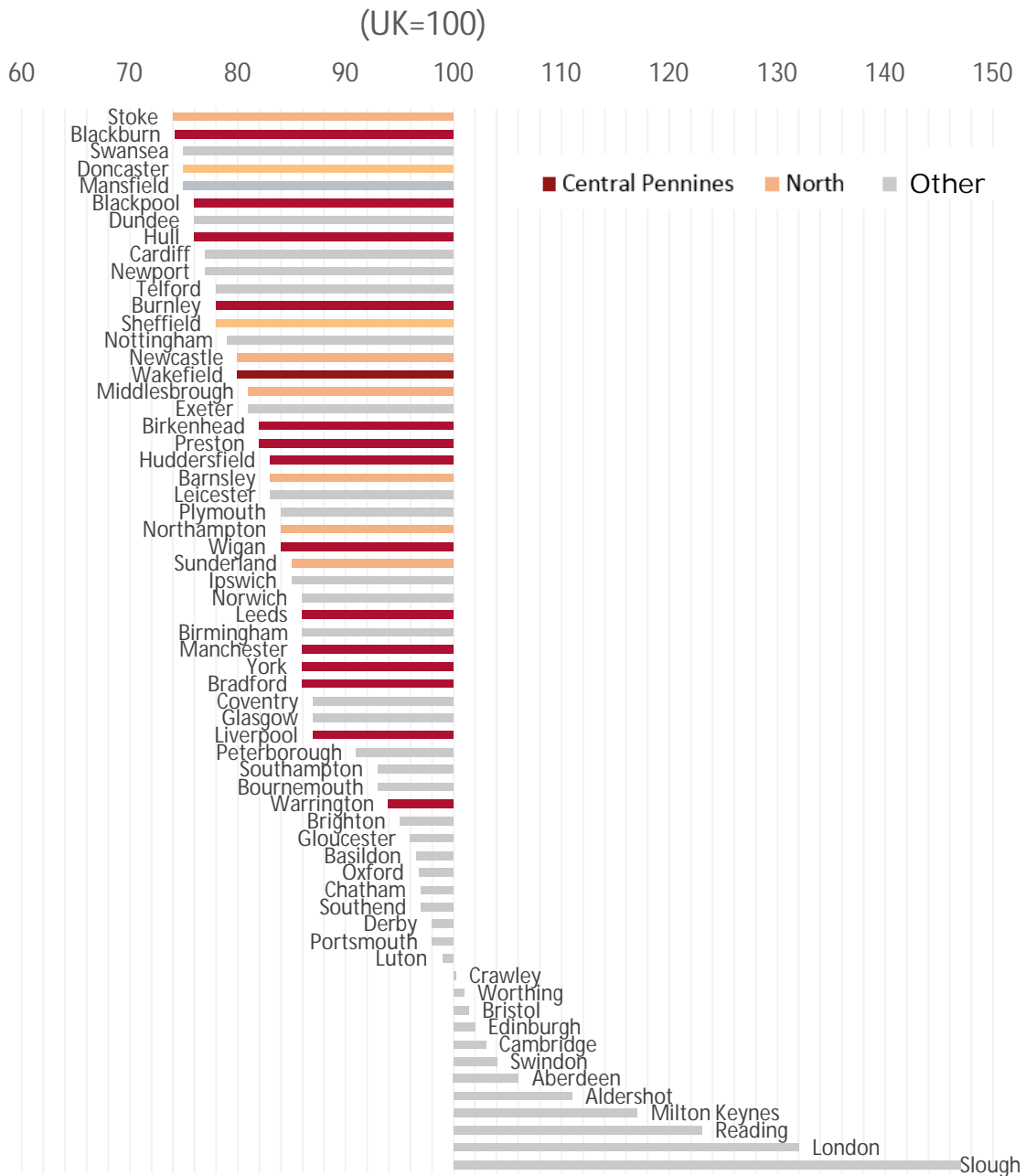
#### *GVA – The Performance Gap*

3.10 The Independent Economic Review (IER) demonstrated that there is a gap in the North's prosperity and productivity (that is, a performance 'gap', measured by GVA per capita) that is persistent and entrenched, being consistently 25% below the rest of England average and around 10-15% below the average when London is excluded. Considering the relative productivity of the major centres in the North of England it can be seen in Figure 6 that many of those which are under performing are located in the Central Pennines SDC.

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<sup>28</sup> The prime and enabling capabilities were identified in the Northern Powerhouse Independent Economic Review (2016). They have been identified as differentiated and distinctive at a Pan-Northern level, highly productive and able to compete at national and international scales. Prime and enabling capabilities are as follows: Advanced Manufacturing, Energy, Health Innovation, Digital, Financial and Professional Services, Logistics, and Education (primarily Higher Education)

Figure 6. Relative Productivity of major centres within the Central Pennines SDC, North of England and other parts of the UK (GVA per head index 2015)<sup>29</sup>



*Employment Rate – The Employment and Skills Gap*

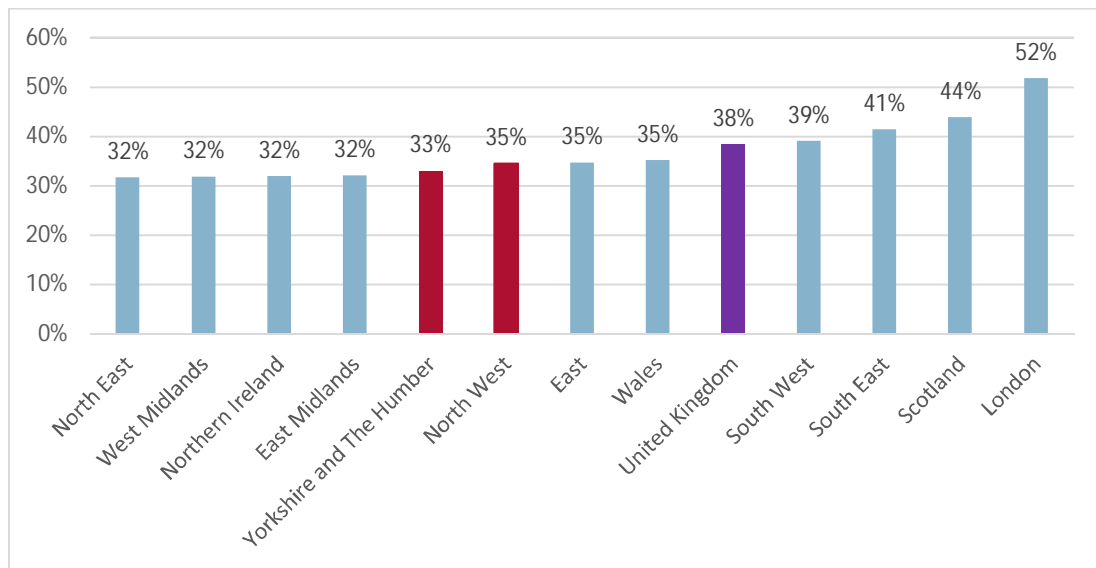
3.11 The consequence of this long-term imbalance is that London and the South East have become a magnet for investment, business and skilled workers. Meanwhile much of the rest of the country (including the North) lags behind, with the former industrial powerhouses of the North among the

<sup>29</sup> Source: Author’s analysis of Centre for Cities, the role of place in the UK’s productivity performance, 2-17, productivity performance based on 2015 ONS data (GVA per head index) Central Pennines cities highlighted in red and other North of England cities highlighted in orange.

worst performers. With a higher share of people with lower skills (a problem which has worsened in the post-recession period), the North has suffered from a range of inter-related issues which can also be used to indicate the significance of the performance gap in the North.

- 3.12 While the employment gap is likely to be the result of large numbers of people becoming detached from the labour market as they are not able to find the right job opportunities for them<sup>30</sup>, the skills gap is likely to be the outcome of both demand and supply dimensions. From a demand perspective, low educational attainment (especially among younger cohorts) and low employment rates are the key factors contributing to a limited pool of talent that employers can access. From a supply perspective, limited job prospects and an insufficiently dynamic economy to attract and retain higher-skilled workers are critical aspects that influence the attraction and retention of talent.
- 3.13 This is reflected in the proportion of working age population with high levels of qualifications, which is below the UK average in Yorkshire and the Humber and the North West and significantly below London, the South East and Scotland. All these factors play a key role in the development of the labour market<sup>31</sup>.

Figure 7. Proportion of working age population with NVQA+ qualifications in 2017<sup>32</sup>



- 3.14 An analysis of UK skills demand demonstrates that the North West is one of the regions with the highest numbers of job vacancies in the UK, according to analysis from the UK Visa Bureau's 'UK Shortage Occupations List' by Small Business Prices, which is in accordance with the findings of the IER. The North West has particularly high demand for financial sector jobs,

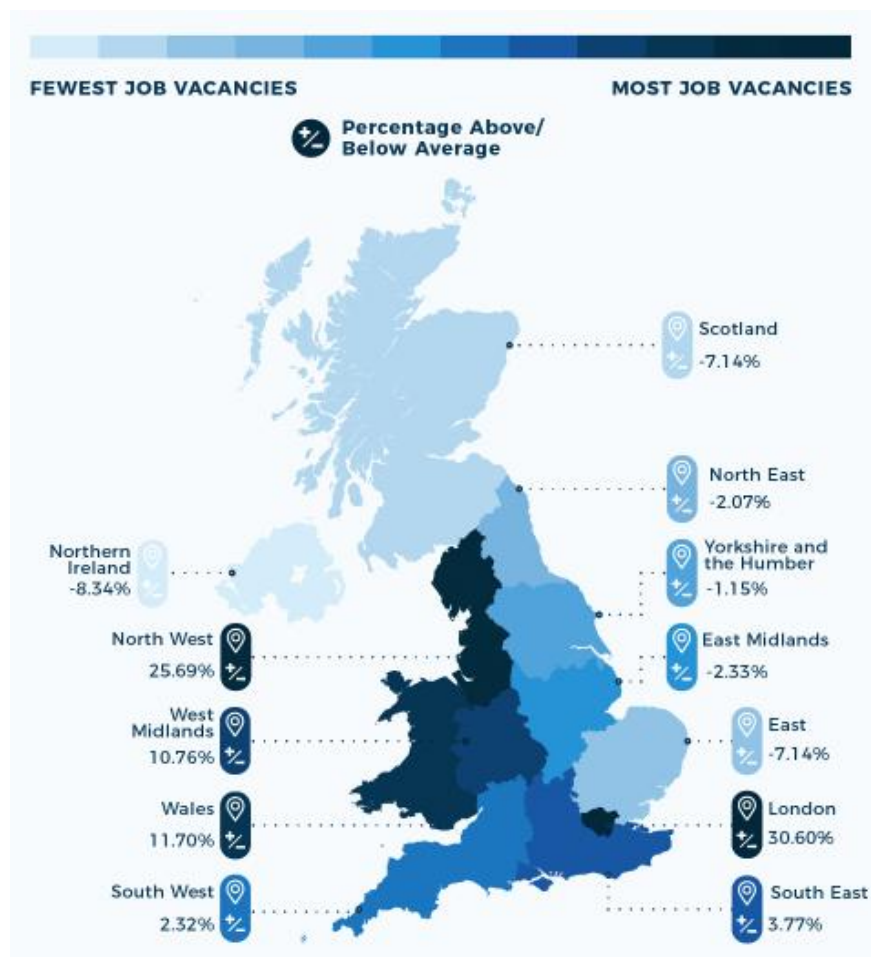
<sup>30</sup> Transport for the North, the Northern Powerhouse Economic Review (2016)

<sup>31</sup> Transport for the North, the Northern Powerhouse Economic Review (2016)

<sup>32</sup> Annual Population Survey (December 2017 data)

directors and CEOs, nurses, social workers, mechanical engineers and welding professionals. This suggests that improving access to jobs from areas with fewer vacancies (such as Yorkshire and the Humber) and attracting talent are key priority areas to improve the functioning of labour markets across the Central Pennines SDC.

Figure 8. Skills demand UK by region<sup>33</sup>



*Labour Productivity – Investing in Northern Powerhouse Cluster Industries*

3.15 The IER identified four areas where the North is highly skilled and globally competitive. These are called 'prime capabilities - promoting, growing and connecting the North's prime capabilities could result in higher productivity:

- Advanced manufacturing – capitalising on the North's industrial heritage and strengths in advanced materials. Manufacturing was worth £46bn in the North in 2014, over a quarter of the UK's total manufacturing output.
- Health innovation - pioneering clinical research and trials particularly in life sciences, cancer and ageing, pharmaceuticals, research and

<sup>33</sup> Source: <http://smallbusinessprices.co.uk/uk-skills-shortages/>

development. The North exported £7.3 billion worth of pharmaceutical products in 2015, accounting for 45% of all medicinal exports from UK.

- Energy - new technologies for energy security, production, distribution, storage, carbon capture, decommissioning and grid management. 31% of the UK's total renewable electricity was generated in the North in 2015.
- Digital - linking digital capabilities such as cognitive computation, simulation/modelling, financial technology, cyber security, high-performance computing, data analytics (big data), and strengths in media. The North is home to seven of the UK's 27 key tech clusters.

3.16 The prime capabilities are supported by three 'enabling capabilities':

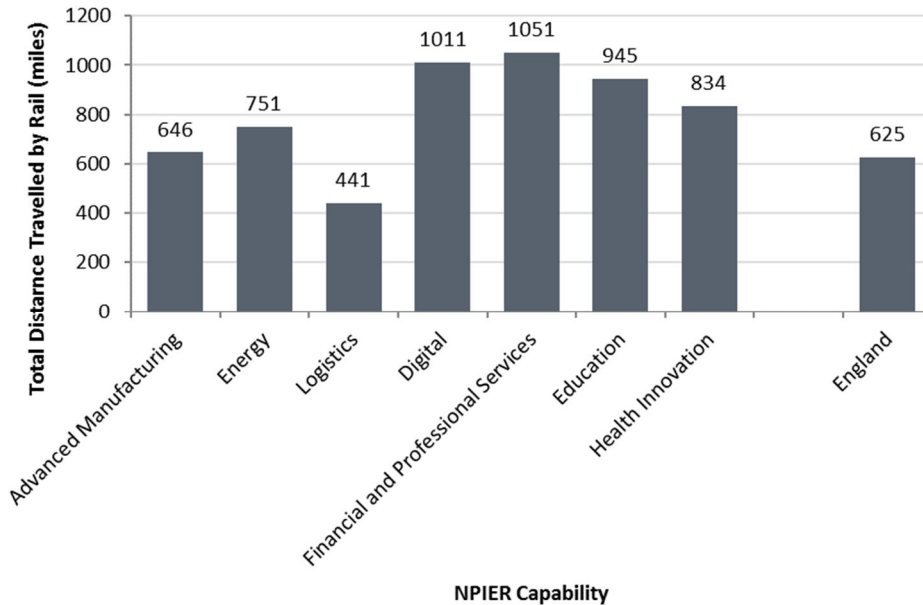
- Education (particularly higher education providing research capability and technical expertise for supplying skilled labour and export strengths);
- Financial & Professional Services (key business, legal, insurance and financial services); and
- Logistics.

3.17 These are services or skills that provide the expertise and support for the North's economy to flourish, as well as significant generators of travel demand:

- Workers within each of the seven capabilities have distinctive travel patterns, in part a result of the different geographies and occupational breakdowns within each capability, but also because of the different mix of people who work in each capability.
- Since those employed in the four prime and three enabling IER capabilities are typically more highly skilled, better qualified and in higher occupational groups, they would be expected to have a greater propensity to travel, especially by rail. Each worker within Finance and Professional Services, for example, makes over 50% more rail trips than the national (England) average.
- Similar trends can be observed in terms of total distance travelled. Workers within all IER capabilities travel greater distances than the England average, with those in the digital, financial and professional and educational capabilities travelling the greatest distances. Notably, workers within Finance and Professional Services travel 65% further by rail than the England average.



Figure 9. Weighted average total distance travelled by rail per person per year by NPIER Capability in England<sup>34</sup>

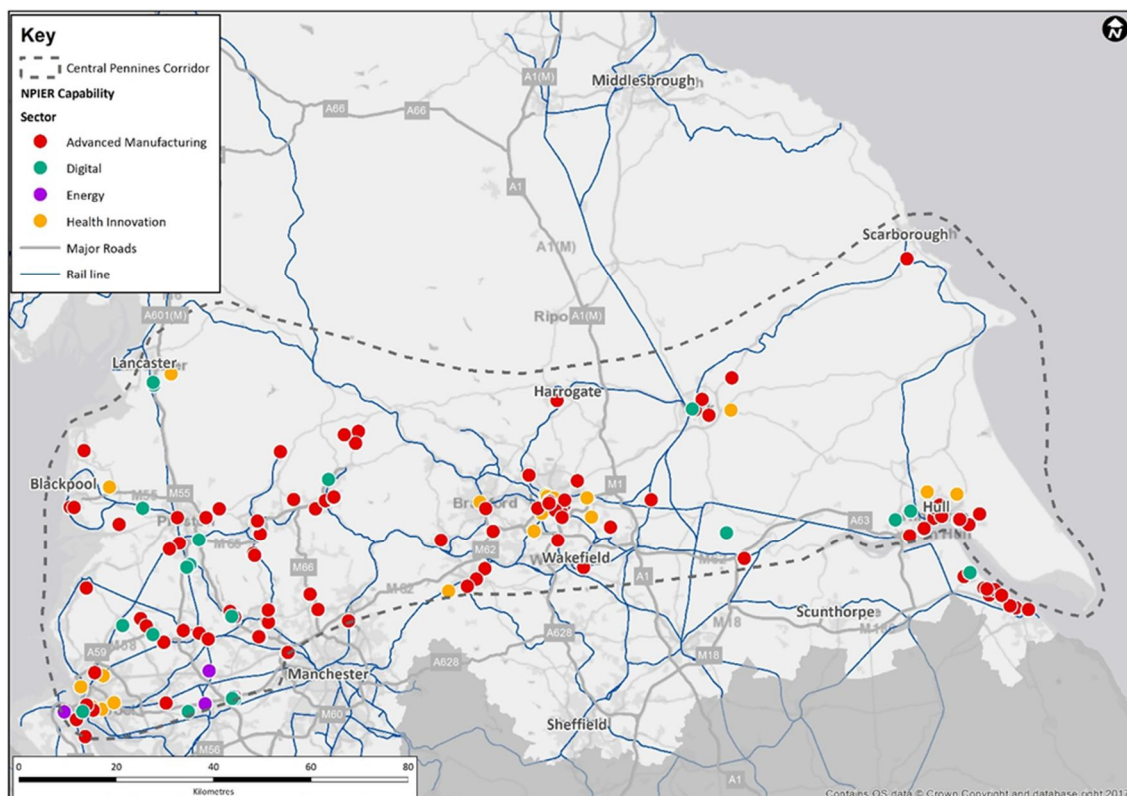


- 3.18 The four “Prime” capabilities and three “Enabling” capabilities, collectively represent approximately 30% of all jobs in the North and over 35% of GVA.
- 3.19 In a ‘transformed future’ scenario, the Northern economy would become more productive, partly through increasing the skills of its workforce and lowering levels of economic inactivity - both these factors are associated with an increased propensity to travel. All other things being equal, increased productivity would therefore be expected to lead to marked changes in both the travel patterns of individuals and aggregate patterns across the entire North.
- 3.20 This corridor is a major economic area of the North, and is home to globally significant businesses, supply chains and economic assets across all the North’s prime and enabling capabilities. Delivering transformational growth is dependent on focussed investment in these prime capabilities and infrastructure. For example, the corridor has the largest aerospace cluster in the UK, including BAE Systems and Rolls Royce, with major sector representation and internationally competitive advantages in sectors such as automotive and other advanced manufacturing.
- 3.21 Further details of the significant sets of clusters in key sectors which have the potential to compete on the national and international scale in the corridor are provided in later in the chapter at paragraph 3.120.

<sup>34</sup> Source: Analysis of National Travel Survey (2013) and Business Register and Employment Survey (2015) data

- 3.22 As can be seen in Figure 10 Northern Powerhouse cluster industries are spread geographically across the corridor. This highlights the need for connectivity to facilitate competition, collaboration and specialisation.

Figure 10. Location of Northern Powerhouse Cluster Industries in the Central Pennines SDC<sup>35</sup>



- 3.23 Changes in investment or economic agglomeration could be expected to lead to greater employment within higher-level occupations and higher incomes, and potentially different lifestyles, leading to further changes in travel patterns. Currently, poor and inconsistent transport links are limiting agglomeration and constraining growth.

### Transport’s influence on economic growth

- 3.24 Better connections at a Pan-Northern level, particularly connections between the North’s existing and future economic assets, will help provide the conditions in which jobs can be created and growth achieved. To realise the benefits of agglomeration, the North requires its networks of railways, roads and also the main inland waterways, to provide effective, resilient and reliable connections. These connections should meet standards of journey time and frequency set by the North. Sufficient capacity will also be required to accommodate the increased passenger and freight travel demand that growth will bring.

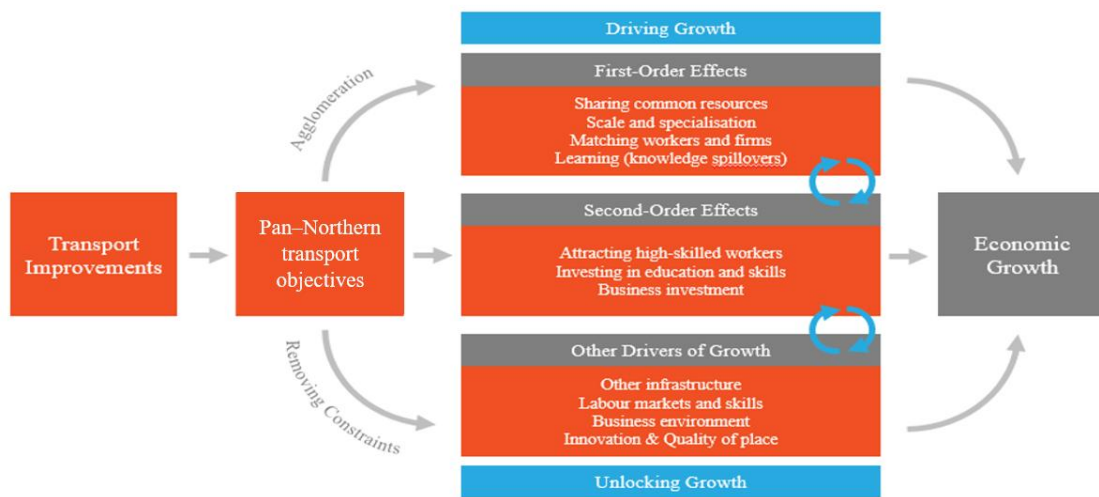
<sup>35</sup> Source: Central Pennines Options Appraisal Report

- 3.25 The work undertaken by the NPIER highlighted that transport connectivity is a key enabler of economic growth. This is true for the North of England, as research shows that the key growth sectors cluster in its city centres. Better transport connectivity is important because:
- Investment in skills is more likely to occur where there is access to well-paid jobs and training
  - Foreign investors are more likely to be attracted to locations that are well connected to global markets and which have access to a well-qualified workforce
  - Firms are more likely to specialise and innovate in areas with deep and extensive labour markets
  - Firms can start to cluster and agglomerate more effectively
- 3.26 Overall, the impacts of transport are wide-ranging and can be grouped into three types: user benefits, productivity, and investment and employment impacts<sup>36</sup>. A logic chain showing how investment in transport infrastructure could flow through to wider economic impacts in the North is shown as Figure 11.
- 3.27 Investment in transport benefits both rail passengers and all road users as well as industry. The forecast growth within the NPIER shows an increase in road and rail usage. This also links to the road and rail freight moved within and out of the North. The key increases in freight flows are currently north/south routes. Additional investment in east-west connectivity would bring opportunities for more people and goods to be moved in those directions and growth in traffic through Northern ports which could see growth in containers and construction goods being moved around the North generating warehousing and processing capability. Close working with the private sector and our partners will be required to see progress made.
- 3.28 Improving transport connectivity in the North of England (both between and within cities) and to/from North Wales will support and enable growth in the key growth sectors and their high value jobs by bringing towns, cities and economic centres across the North closer together, creating the agglomeration benefits of a much larger, single economy.

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<sup>36</sup> Anthony J. Venables et al., *Transport investment and economic performance: Implications for project appraisal* (2014)  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/386126/TIEP\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/386126/TIEP_Report.pdf)

Figure 11: Transport interventions and economic performance



Source: Adapted from frontier economics: Assessing the productivity benefits of improving inter-city connectivity in Northern England (2016), Figure 2.

- 3.29 Markedly improved Pan-Northern connectivity is required to facilitate the development of bigger and more agglomerated labour markets across the North. Closing the transport investment gap will help to address connectivity issues, especially between cities.

### Transport Baseline

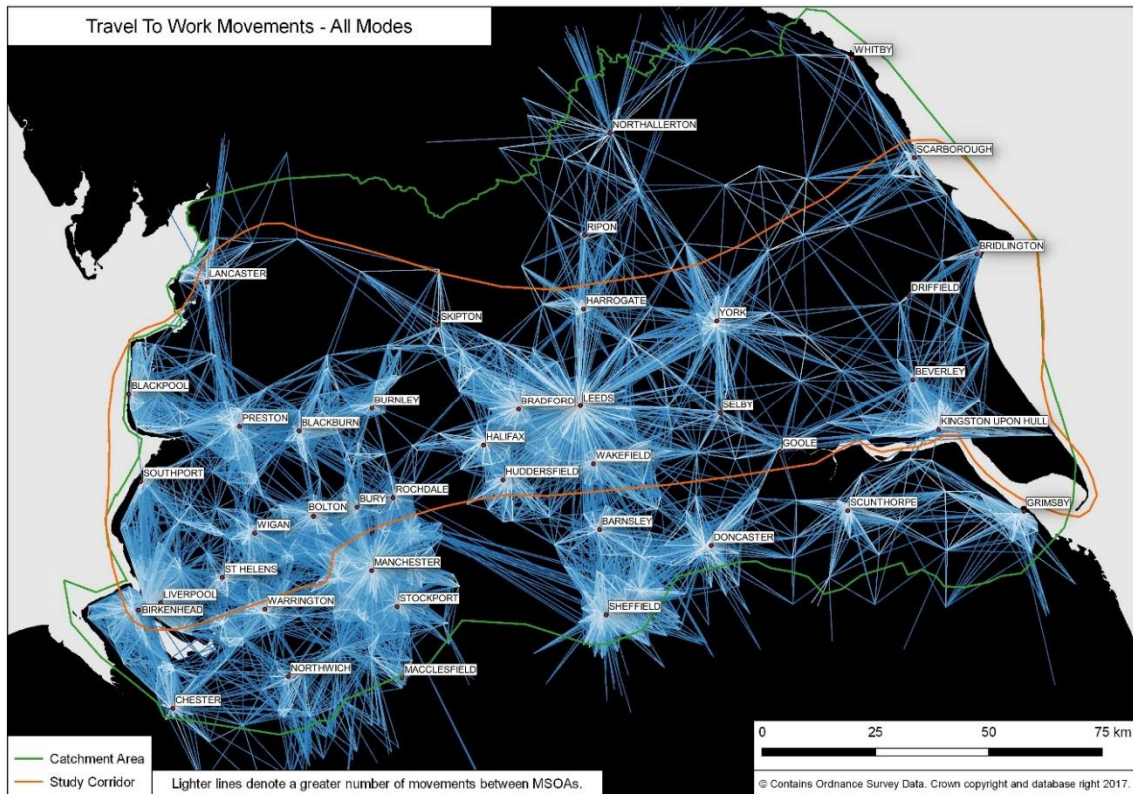
- 3.30 Across the Central Pennines SDC there are a range of transport issues and opportunities including travel demand and interaction between major urban centres, resiliency of the highway network, capacity on the rail network and the environmental impacts of transport across the corridor. These are discussed further below.

#### Travel Demand and Interaction

- 3.31 The North suffers from limited inter-city and intra-city business-to-business connectivity restricting the frequency and efficiency of business interactions within the North and across the rest of the UK. This prevents the region from becoming a single functional economic area and from reaching its economic potential.
- 3.32 Across the corridor there are both physical (such as highway connectivity, journey times and reliability) and economic barriers restricting trade and business interactions. These barriers limit clustering of businesses, that is agglomeration economies, causing under-utilisation of the potential knowledge/innovation spill-overs resulting in improved efficiencies. Alongside this there is a need to support and enhance the transport links already supporting demand, to improve their resilience and reliability, and support growth.
- 3.33 Current travel patterns indicate a significant disconnect between the corridor’s major centres. Analysis of the North’s labour markets indicates that the majority (61%) of the North’s workers lived and worked in the

same local authority district in 2015. Figure 12 demonstrates this based on travel to work data for the Corridor and its travel to work catchment area.

Figure 12: Travel to Work Movements - All Modes (2011 Census Data)



- 3.34 Studies have shown that commuting patterns in Leeds, Manchester, and Liverpool are relatively self-contained in comparison to say the Randstad in the Netherlands, where there is significant commuting between city regions<sup>37</sup>.
- 3.35 It is the physical challenge of the Pennines which is regarded as the key barrier to east-west connectivity – although slight by European standards the topography of the Pennines remains a formidable barrier to movement. Twice as many road trips are made between the Liverpool City Region and Greater Manchester as between Leeds City Region and the Greater Manchester & Liverpool City Regions combined. Commuting between Leeds and Manchester by all modes is 40% lower than expected<sup>38</sup> when comparing to city pairs that are similar distances apart in the UK, and similar polycentric regions in Europe.
- 3.36 The North of England's mixed-use, predominantly two-track railway presents capacity limitations which require trade-offs to be made between

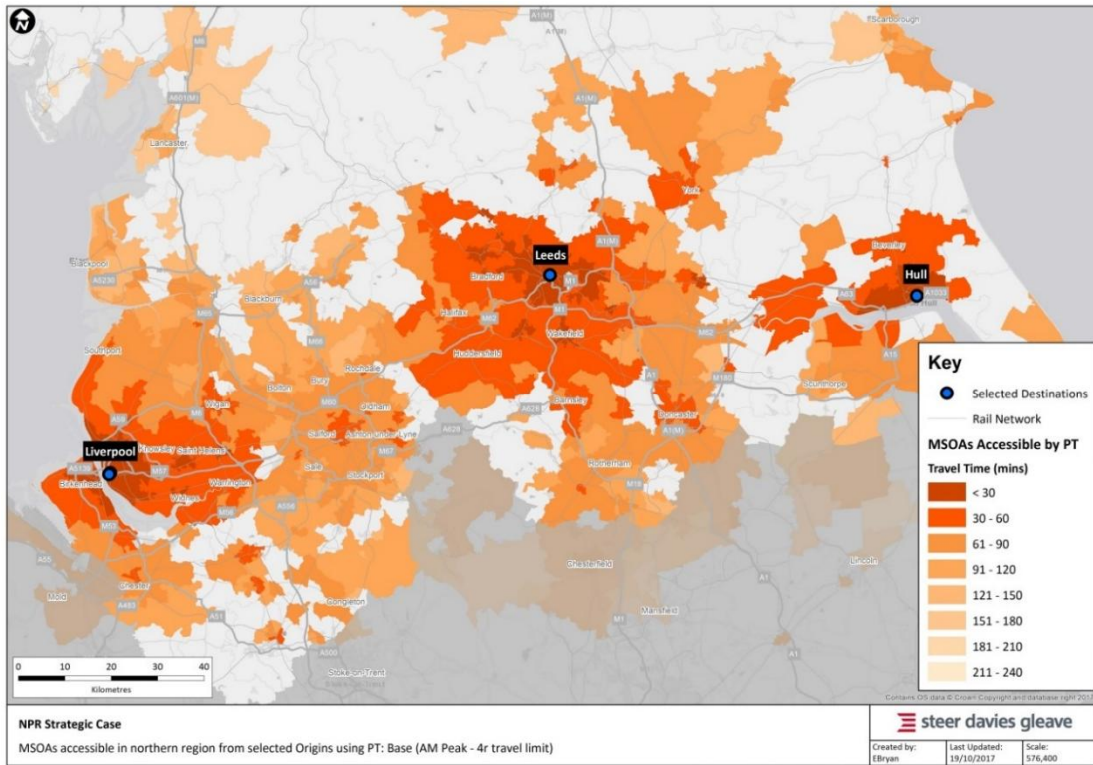
<sup>37</sup> The Northern Transport Strategy: Spring 2016 Report references the Randstad region in the Netherlands, an economically successful polycentric region that generates approximately half of the Netherlands' GDP. The convenient, interconnected Randstad transport network allows people to live in or near any of the cities and commute to work in any other.

<sup>38</sup> TfN Strategic Transport Plan

service frequencies, calling patterns and performance. Combined, these limitations present connectivity gaps which serve to increase generalised journey times to, from and between the corridor’s population centres.

- 3.37 Even for major and relatively well-connected cities, the population catchment within an hour’s rail journey time often does not extend beyond their immediate geographic area. These gaps are barriers to the agglomeration and labour market effects required to achieve transformational growth in the North, see Figure 13.

Figure 13: Journey Time<sup>39</sup> by Public Transport to Liverpool, Leeds and Hull



- 3.38 A current programme of transport infrastructure investments across the North is currently being developed with the aim of transforming connectivity across the region – these are principally focussed on the North’s major centres. Building on this platform, further intervention is required to ensure the connectivity improvements provided the reference case is enhanced and distributed spatially.

Major Road Network

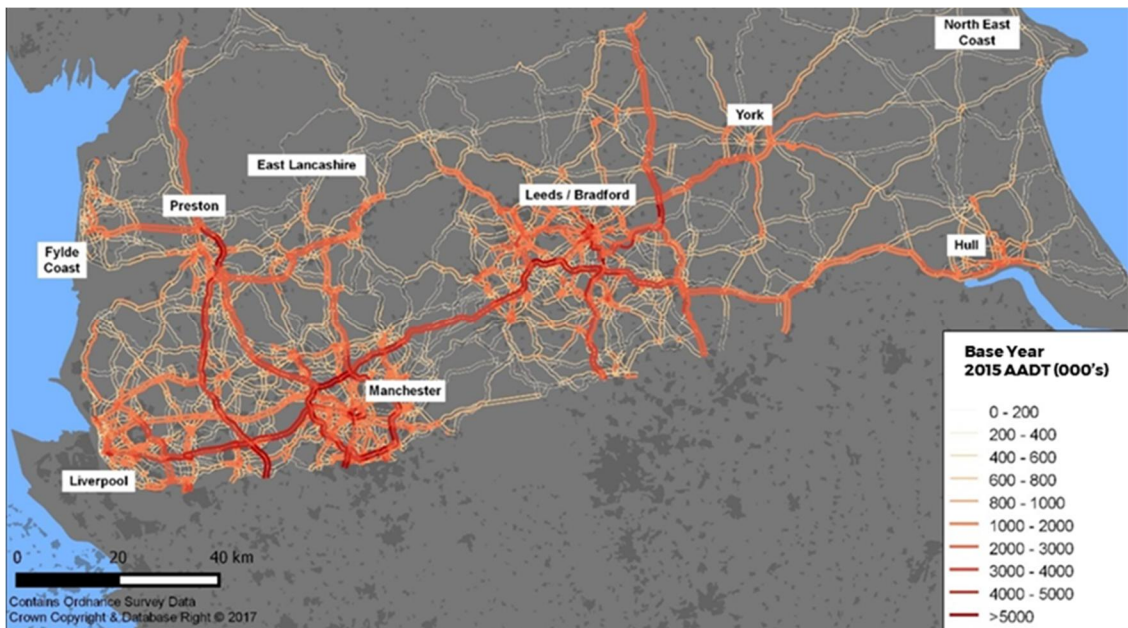
- 3.39 Over 80% of commuting trips and 87% of freight movements use the road network in the North, which equates to more than 120.4 billion km travelled across the North’s road network every year. TfN has identified a Major Road

<sup>39</sup> TRACC analysis

Network (MRN) for the North<sup>40</sup>. That is the network of economically important roads, the performance of which in terms of reliability and resilience is vital to supporting the achievement of transformational growth.

- 3.40 The ability of northern stakeholders to work together as one and generate the benefits for the whole of the UK is currently heavily dependent on the successful operation of just one road, the M62 motorway; providing access to and from major ports, coastal and in the future inland, and major airports, meaning that longer distance freight and regional freight distribution is a major component of the traffic mix.
- 3.41 The M62 carries half of all Trans-Pennine traffic, including the majority of road freight which is forecast to increase by 23% by 2050, with other Trans-Pennine routes having comparatively lower flows. In summary the highest traffic flows on the major road network are focussed on:
  - M6, particularly south of M62 and around Preston;
  - M62, with highest flows in Merseyside, Greater Manchester and through the West Yorkshire conurbation;
  - M60 Greater Manchester outer ring road;
  - M1 through West Yorkshire; and
  - Major centres including Liverpool, Manchester and Leeds.

Figure 14: Daily Traffic Volumes<sup>41</sup> on the TfN Major Road Network

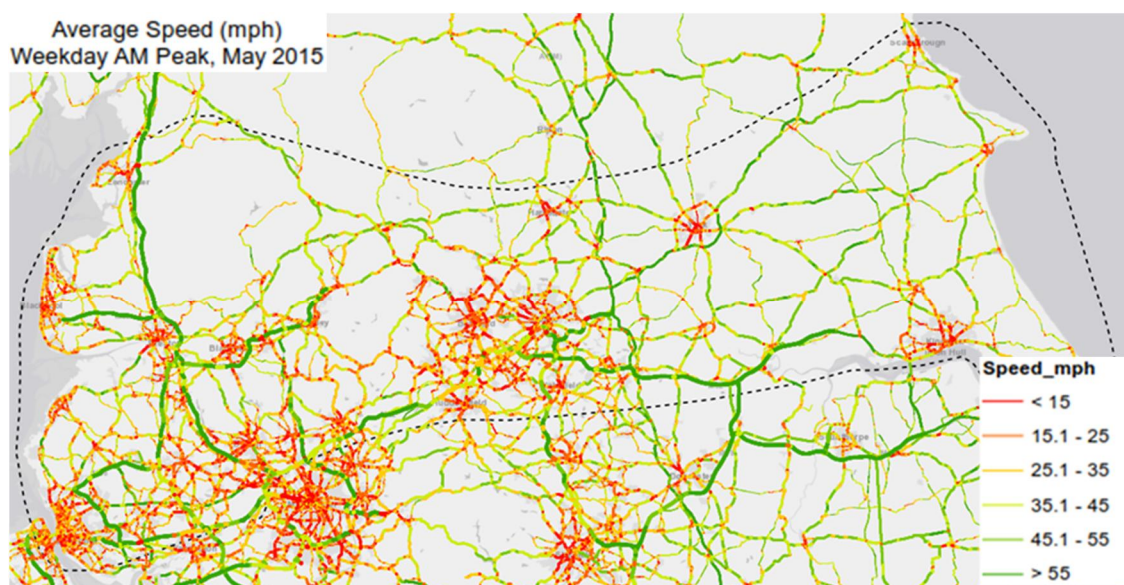


<sup>40</sup> The Governments Transport Investment Strategy set out proposals to create a Major Road Network across England, and also to allocate a proportion of the National Roads Fund to be invested in the Major Road Network. The National Roads Fund will be the principal source of Highways England’s Road Investment Strategy 2 programme (to run from 2020 to 2025) as well as for interventions on the Major Road Network (as defined by the Department for Transport).

<sup>41</sup> Source: Highways England’s Trans-Pennine South Regional Highway Model

- 3.42 It is important to emphasise that whilst carrying reduced traffic volumes significant parts of the TfN MRN provide vital strategic connectivity to/from/through areas which are not well served by other transport links.
- 3.43 At present the M62/A63 (T), and M60 for the section north of Manchester, is the only continuous dual carriageway route between Liverpool and Hull, resulting in pressures in terms of efficiency, reliability and resilience. A key cause of capacity issues on the M62 corridor is the fact that the route passes through three major conurbations, each of which places significant pressure on the corridor through the generation of large numbers of (relatively) local trips which compete for the available capacity with longer distance movements.
- 3.44 The M62 will continue to have a central role in supporting future east-west movements and the realisation of transformational and local growth opportunities. TfN expects to see through Highways England's Roads Investment Strategy continued investment in the Strategic Road Network (SRN) in the short, medium and long term.
- 3.45 Much of the MRN for the North, comprising the SRN managed by Highways England plus other significant routes identified by TfN, is currently operating at or close to capacity during peak periods. Average inter-urban speeds between important economic centres are low, typically less than 30 mph during peak periods, and below 40 mph during inter peak periods in the Corridor.

Figure 15: Average Road Speeds<sup>42</sup>



<sup>42</sup> Source: DfT Trafficmaster Data – average road speeds (mph) for the weekday morning peak (May 2015)



- 3.46 There is a need to improve east-west connectivity (road and rail) between the North's towns and cities within the Corridor. Road connections are variable in quality. For example, the M65 terminates at Colne to the west of the Pennines, with onward connectivity to Yorkshire largely via a network of lower standard roads which lack coherence, capacity and resilience.
- 3.47 In North Yorkshire, East Yorkshire, Hull and Lancashire there is an identified need to enhance the resilience and reliability of the road network and to improve journey time reliability on the A59, A63, A64, A1033, A1079 and A1237 road corridors. Such factors all lead to localised labour markets, narrow travel horizons and limited interaction with adjacent economies in the corridor.
- 3.48 Better connections at a Pan-Northern level, particularly east-west connections between the North's economic assets, will help create jobs and generate growth. To realise the benefits of agglomeration and economic mass, the North requires faster, more efficient and reliable journeys on the major transport networks. In effect, more east-west dual carriageway 'rungs' are needed on the ladder between the M62 and the M8 in Scotland.

#### Passenger Rail Network

##### *Northern Context*

- 3.49 The North currently has a modal share for rail for commuting of 3.4%, defined both in terms of residence and workplace. Whilst this is comparable with the rest of England outside of London and the South East, and potentially masks concentrations of the higher rail modal share on key routes to/from for journeys to the North's larger urban centres, but indicates that overall, a relatively small proportion of the North's population use rail to commute, and that there is significant scope for rail to increase its share of the market as the economy grows.
- 3.50 There is currently a disparity between north-south and east-west passenger rail connectivity in the North of England. Those services which utilise the East Coast, West Coast and Midland Main Lines for some or all of their journey tend to be significantly quicker than those operating across east-west corridors such as the North Trans Pennine, Hope Valley, Tyne Valley or Calder Valley routes.
- 3.51 Some major Northern cities such as Bradford and Hull lack direct connectivity to other major cities, such as Birmingham and others have no direct link to London.
- 3.52 It is important to the North that its businesses can readily access important suppliers, markets and collaborators beyond the North of England, particularly in key centres such as London, Edinburgh and Birmingham, as well as economic centres such as Cambridge.
- 3.53 HS2 Phases 1 and 2a will provide a step-change in north-south connectivity once completed in 2026/27. The scheme will deliver a dedicated high-speed railway line between London and Crewe, with high speed services running on the 'conventional' rail network to Liverpool, Manchester and further

north on the West Coast Main Line. HS2 Phases 1 and 2a will significantly reduce journey times and increase capacity between cities in the North of England, Birmingham and London.

- 3.54 Current proposals for Phase 2b of HS2, intended for completion in 2033, will extend the dedicated high-speed line from Crewe to Manchester via Manchester Airport, as well as create a further line which will link Leeds and Sheffield to London via the East and West Midlands. A link to the East Coast Main Line at York will allow high speed services to serve destinations north of York, including Darlington, Durham and Newcastle.
- 3.55 Connectivity between the North's centres, in terms of passenger service frequencies and journey times, is too often poor, extending the perceived distance between centres and acting as a barrier to travel. Issues such as overcrowding and poor on-board facilities can make rail travel unproductive, effectively removing one of rail's key advantages over other modes.
- 3.56 Direct rail connectivity to some leisure destinations is currently poor – for example there are often no direct rail services between coastal centres and potential sources of visitors in major population centres in the North and elsewhere.
- 3.57 Where services do exist, timetables and capacity provision are not always aligned to seasonal demand patterns and special events, with evidence of overcrowding at key times. Facilities on-board trains serving tourist destinations are not always well-suited to the needs of groups and families, nor those with luggage, where storage space can be limited. Infrequent services and slow journey times, particularly on routes which could serve as a gateway to National Parks and rural destinations, present a further barrier to rail travel.
- 3.58 Currently, rail service provision from economic centres to their catchments in the evening is inconsistent. There are some good examples of connectivity in the evening, but there are also examples of last departures earlier than 10pm, particularly on Sundays. First arrival times on Sundays can also be poor in some cases, and certain lines are closed entirely, preventing any services from operating. Additionally, a few open lines are void of any passenger services and in certain cases this is expected to continue into the next franchise. Investment in service improvements committed in the Northern and TransPennine Express franchises will go some way towards addressing these issues, but gaps will remain.
- 3.59 The community rail movement has helped to put the local community at the heart of their railway by creating job and local enterprise opportunities; creating social cohesion through supporting diversity and inclusivity and by reducing the adverse societal effects caused by the abandonment of parts of the railway. Community Rail has been a catalyst for bringing partners together to work towards physical, economic and social regeneration. This includes a notable, growing number of community station projects across

the North helping to support wider regeneration, as well as signs of community rail playing a broader role in community development.

- 3.60 With regards to international connectivity, passenger rail provides:
- surface access (either directly or via interchange with other modes) to the North's airports (particularly Manchester, Newcastle, Liverpool John Lennon, Leeds Bradford, and Doncaster Sheffield), ensuring that airports can draw upon the widest possible catchment areas, making it attractive for airlines to expand global connections.
  - wider rail connectivity to continental Europe via the HS1 Link and the Channel Tunnel.
- 3.61 Surface access to the North's five key rail-connected port areas on major estuaries (Humber, Immingham, Tees, Mersey, and Tyne), and several rail-connected sub-regional ports. During 2014/15 178 million tonnes of freight was transported through ports in the North, almost 38% of the Great Britain total. In addition, the North boasts a network of inland waterways (such as the Manchester Ship Canal access to Trafford Park, access to Hull via the Humber, etc.), where rail may play a role in improving intermodal connectivity.
- 3.62 Rail can play a significant role in addressing the barriers to travel faced by a diverse section of society. Accessibility both to/from and at rail stations and on trains should not be barriers to travel and TfN is committed to supporting improvements to stations and trains, and influencing new franchise commitments to reduce the barriers to travel for all.

*Central Pennines SDC*

- 3.63 Considering the Central Pennines SDC specifically, there is variance in passenger service frequencies and journey times. Some sections of corridor (between York and Leeds, and between Preston and Blackpool, for example) are served by relatively high-frequency services, providing passengers with a 'turn up and go' style service. However, others are served hourly or less which, as well as limiting the opportunities to travel, can serve to:
- increase the end-to-end journey time (as the service needs to call at all intermediate stations);
  - increase waiting time associated with interchange (particularly with services of a similarly low frequency); and
  - reduce resilience to delays, cancellations, or missing the train.

Figure 16: Intercity and Interurban Services Average Speed Map

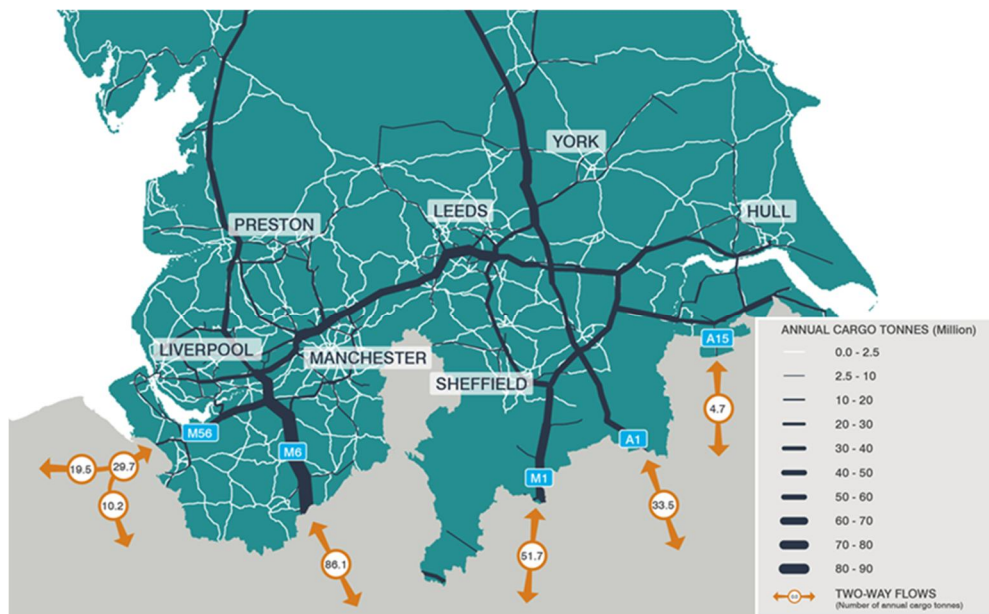


- 3.64 Certain journeys, particularly those operating via the East and West Coast Main Lines, can achieve high average speeds which are competitive with private car travel between urban centres. Others are much slower, with some average speeds below 40 mph, even between larger economic centres. The attractiveness of rail relative to other modes is inhibited by these connectivity weaknesses.
- 3.65 East – west connectivity across the Central Pennines SDC is particularly constrained, with low average speeds and frequencies on key routes providing connectivity between East Lancashire and West & North Yorkshire. Infrastructure capacity can be heavily utilised by the mix of traffic and stopping patterns which can present a barrier to service improvement.
- 3.66 Other specific rail issues include:
- There is constrained connectivity due to indirect linkages between centres on the north-south (Clitheroe to Manchester) and east-west (Calder Valley) corridor;
  - Need to accommodate mixed rail traffic, with varying speeds and calling patterns, on a predominantly two-track railway, present capacity constraints; and
  - Ageing rolling stock deployed on many routes across the Corridor, although new or refurbished rolling stock is committed to be delivered from 2019, providing a quality improvement.
- 3.67 Reference case and Strategic Outline Programme (SOP) interventions have the potential to pose capacity challenges at key stations across the network, including at Leeds, Preston, Bradford Interchange, Manchester central stations and York. These challenges will require careful planning and mitigation.

## Freight

- 3.68 The M62 is the only major motorway route across the Pennines with other Trans-Pennine routes having comparatively low freight flows. Freight is especially vulnerable to resilience issues on the major road network as the primary users of the network and due to operational needs for timeliness of deliveries.
- 3.69 Road is by far the dominant mode for the movement of freight with an 87% mode share by tonne km by road in 2016. The Great Britain Freight Model (GBFM) predicts a 62% growth in tonne km between 2016 & 2050. This will put significant pressure on the existing road infrastructure as the consumer demand for freight increases and without improvements will have a negative impact on congestion, regional air quality and costs. The growth in Regional Distribution Centre activity within the corridor in recent years can be largely attributed to site availability and connectivity to the SRN. The M62 has also seen a significant increase in use for local freight distribution particularly for delivery van trips.

Figure 17: Road Freight Annual Cargo Tonnes<sup>43</sup>

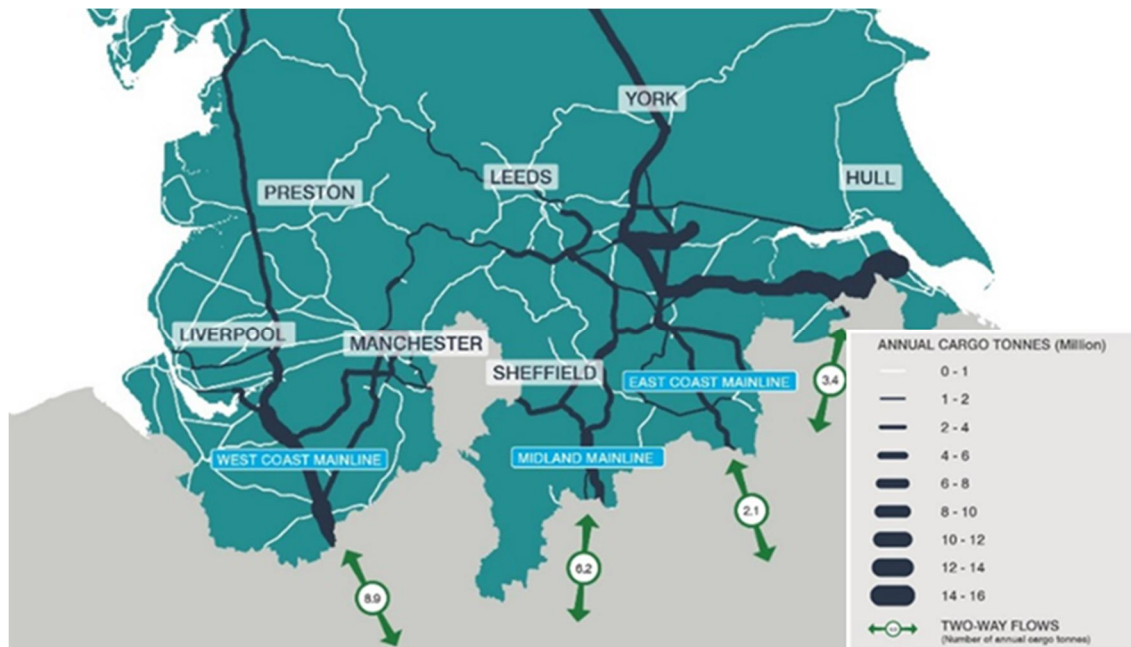


- 3.70 There are currently capacity issues for rail freight travelling east-west. This is due to a combination of pathing constraints on the network, and the lack of appropriate gauge clearance for the largest freight wagons such as those used to transport intermodal container units (particularly refrigerated units where W12 clearance is required). Other barriers also exist in the form of inability to operate longer and heavier trains and poor infrastructure serving the North's major ports.

<sup>43</sup> Source: TfN Enhanced Freight and Logistics Analysis, January 2018 - 2016 road freight annual total cargo movements (Tonnes)

- 3.71 While the amount of rail freight moved is smaller, 12% mode share by tonne km in 2016, growth is expected and is driven primarily by the movement of intermodal freight between the Southern ports and the North of England. The GBFM predicts a 53% growth in tonne km between 2016 & 2050. Capacity on the rail network for freight is a key issue, which the projected growth will only exacerbate.
- 3.72 Despite a low mode share (less than 1%), there is a network of inland waterways within the Corridor. The Manchester Ship Canal stretches from the Mersey at Liverpool through Warrington to Salford. Ships and barges regularly use the Manchester Ship Canal to transport goods to and from ports at Runcorn, Warrington, Irlam and Salford – and there are proposals for new and enhanced terminals such as the proposed ‘tri-modal’ terminal at Port Salford. There are challenges in terms of infrastructure on the route with key crossings being closed to vehicles as ships pass through the canal. This can lead to localised congestion.

Figure 18: Rail Freight Annual Cargo Tonnes<sup>44</sup>



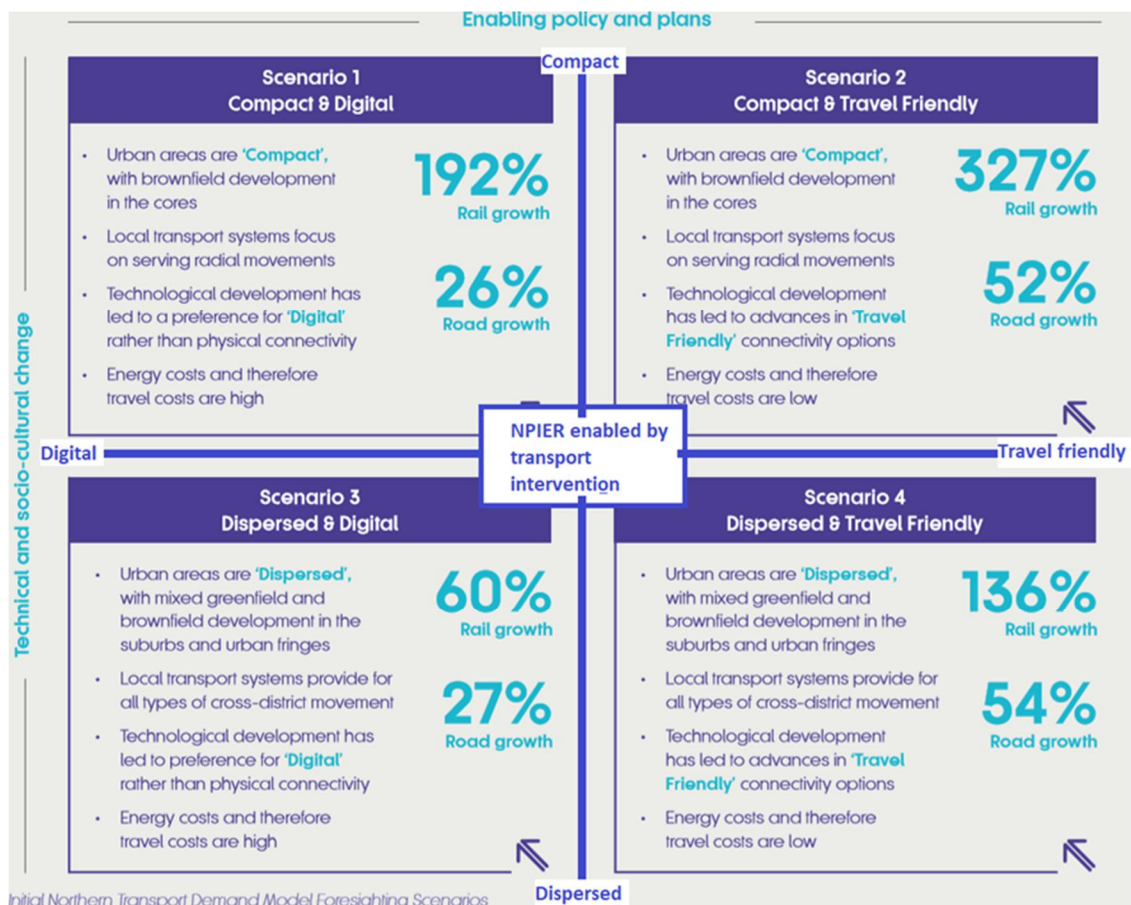
- 3.73 The Aire and Calder Canal is accessed from the Humber Estuary and River Ouse at Goole and runs west towards Leeds. There are numerous barges in use on the canal that transfer bulk goods from the Ports on the Humber, with development underway focused around providing more space for the deliveries of bulk materials related to construction. Infrastructure, however, is a constraint on the canal in terms on bridge heights for example, which limit the size of vessels that can use it.

<sup>44</sup> Source: TfN Enhanced Freight and Logistics Analysis, January 2018 - 2016 rail freight annual total cargo movements (Tonnes)

### Future demand for personal travel under a transformed North

- 3.74 Transformational economic growth in the North is expected to lead to far-reaching changes in transport demand and travel patterns compared to today. There is potential for significant changes in transport accessibility to transform the economic geography of the North. Improved transport infrastructure will stimulate new travel patterns, as individuals adapt their behaviour to take advantage of enhanced connectivity to access new employment opportunities.
- 3.75 To reflect uncertainty regarding key factors affecting travel demand, TfN has developed four future scenarios representing the potential variation in travel markets in the North by 2050. The assumptions have been grouped so that each scenario represents a coherent and plausible future. No one scenario is more likely than another – but taken together they represent the likely range of outcomes in travel demand in the North.

Figure 19: Initial Northern Transport Demand Model Foresighting Scenarios



- 3.76 Total demand for rail travel is expected to be up to four times higher than today<sup>45</sup>. This would mean an increase in the current total of 178 million trips in the North to around 760 million trips by 2050. In a transformed North, total demand for road travel is forecast to increase by up to 54% by

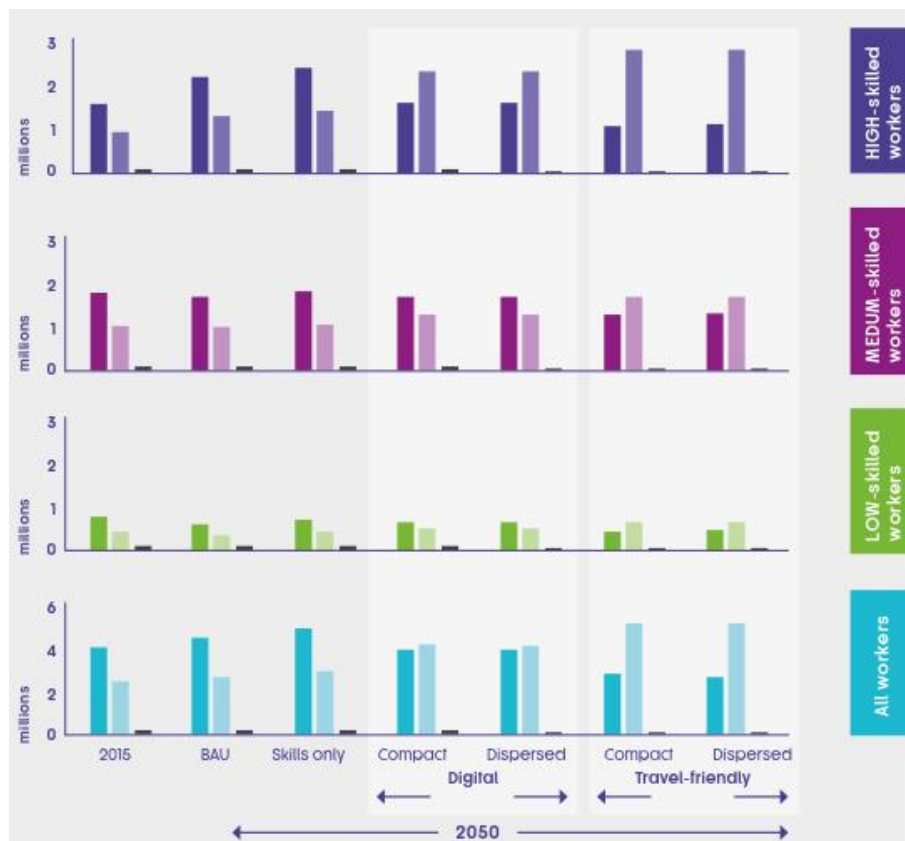
<sup>45</sup> Future Transport Demand in the North of England, TfN (June 2017)

2050. This would mean an increase in the current total of 126 billion vehicle km travelled in the North to 193 billion vehicle km by 2050.

3.77 As described previously, analysis of the North’s labour markets indicates that the majority (61%) of the North’s workers lived and worked in the same local authority district in 2015. Under the business as usual scenario, this proportion is not expected to change in to the future. However, in a transformational scenario, the proportion of workers taking employment outside of their home district is expected to markedly increase by 2050. The greatest change is expected for high-skilled occupations, who already have a higher propensity to travel further for work.

3.78 Figure 20 below shows the commuting patterns in terms of flows of workers in the North in 2015 and 2050 under the five scenarios. It shows that in all scenarios, workers are more likely to commute across local authority district boundaries, especially among high-skilled workers and in the two Travel Friendly scenarios.

Figure 20: Commuting patterns in the North in 2015 and 2050 under five scenarios<sup>46</sup>



<sup>46</sup> Source -TfN’s Labour market and connectivity report. The vertical axes represent the number of workers in the North in a given year. Each cluster of three bars shows the numbers commuting (1) within the same LAD, (2) between LADs in the North, and (3) from outside of the North, for a particular skill group and scenario



- 3.79 Even in the two Digital scenarios, the number of workers commuting across local authority district boundaries in the North is some 70% higher than in 2015, whilst the number of actual workers is only some 20% higher. In the two Travel Friendly scenarios, it is more than double the number in 2015.

## International Connectivity

### *Airports*

- 3.80 International connectivity and accessibility is important to support a dynamic Northern economy. The corridor and its wider catchment area has five international airports including Manchester, Liverpool, Leeds Bradford, Doncaster Sheffield and Humberside. These are net importers of passengers with the catchment areas for flights being significantly beyond the region's boundaries including the North Midlands, North Wales, southern Scotland and the East Midlands.
- 3.81 Manchester Airport is the global air gateway to the North, handling 28.0 million passengers per annum (mppa) based on 2017/2018 data<sup>47</sup>, and is the 3<sup>rd</sup> largest airport in the UK after Heathrow and Gatwick, while Liverpool and Leeds Bradford are 'ranked' 12<sup>th</sup> and 15<sup>th</sup>, handling 5.0mppa and 4.0mppa respectively. Despite this lower base both airports have significant roles to play in supporting the corridor's economy:
- Liverpool John Lennon Airport is one of the fastest growing airports in the UK with passenger numbers increasing almost ten-fold since the mid-1990s with plans to accommodate 11mppa by 2050. However, the necessity for better surface access including optimising multimodal accessibility as well as improving both rail and road connectivity has been identified as a central challenge to be overcome to maintain the airport's role as a central gateway for international and national visitors<sup>48</sup>; and
  - Leeds Bradford International Airport is an international gateway for the Leeds City Region and much of neighbouring North Yorkshire. A rapidly expanding airport with plans to increase passenger numbers to 7mppa by 2030. Many of the highway routes that provide access to the airport are congested particularly during peak periods. Average speeds on some of the routes are less than 10mph, specifically the radial corridors towards Leeds and Bradford city centres. Leeds City Council and West Yorkshire Combined Authority are working with partners, including Bradford Council and Leeds Bradford Airport on surface transport improvements for Leeds Bradford Airport, ensuring that it can play a key role in enabling regional economic growth.

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<sup>47</sup> Total passenger traffic November 2017 – October 2018, from UK Civil Aviation Authority statistics

<sup>48</sup> Liverpool John Lennon Airport, Master Plan to 2050 (2017)  
<https://www.liverpoolairport.com/media/2561/ljla-master-plan-to-2050-full-document.pdf>

- 3.82 Most of the freight travelling by air into and out of the North does so in the belly hold of passenger aircraft, particularly long haul wide body aircraft. As a result of this the major freight flows by air into and out of the North are focused on Manchester Airport. Much of the air freight which arrives or departs the North of England is currently moved by road. The scope of either influencing modal shift or redirecting air freight to Northern airports is limited until a greater number of long haul passenger or dedicated cargo services are introduced.

#### *Ports*

- 3.83 The UK, as an island nation, relies heavily on water-based freight to deliver imports and ship exports to and from a wide range of global destinations. In order to achieve this a number of major ports are located throughout the North of England alongside a greater number of smaller ports serving local areas. The Central Pennines contains two key port areas on the major estuaries of the Humber and Mersey.
- 3.84 The Humber ports handle the largest shipping volumes, the majority of the freight handled by the Humber ports arriving via short sea shipping routes.
- 3.85 The Mersey ports are evenly balanced between short sea shipping, serving as a major hub for the Irish Sea area, and deep sea shipping, with aspirations of future growth in the latter via the new container berth known as "Liverpool 2". Peel Ports also operate the innovative container ship service from the Port of Liverpool along the Manchester Ship Canal.
- 3.86 The landside facilities for the distribution of goods to and from these ports is imperative to increasing their attractiveness and ensuring freight is moved efficiently across the transport network.
- Port of Liverpool: Road access to the port is via existing A5036, which is an urban dual carriageway. This links the port with the Switch Island interchange of the M57 and M58 motorways which in turn link to the M62 and M6 respectively. The A5036 and Switch-Island already suffer from a high level of congestion – a situation that is set to get worse in the future. The A5036 Princess Way improvement scheme will see a comprehensive upgrade to improve traffic conditions on the main link between the Port of Liverpool and the motorway network. Whilst rail provides an attractive method for moving bulk materials, the network needs to be effective in accommodating these movements. A good example<sup>49</sup>, of where the North falls short in this regard currently is the Biomass (wood pellet) traffic that is brought into the UK through the Port of Liverpool for onward transport by rail to the Drax site at Selby. The average time for a loaded train on what is essentially a 100 mile journey is over 7 hours, an average speed of just 16 mph. The route that trains take is not direct and often takes a considerable amount of time at low speeds due to capacity concerns (related to train weight and

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<sup>49</sup> Source: TfN Enhanced Freight and Logistics Analysis, January 2018 - Drax Power case study

pathing constraints) on the east-west routes between Liverpool and Yorkshire.

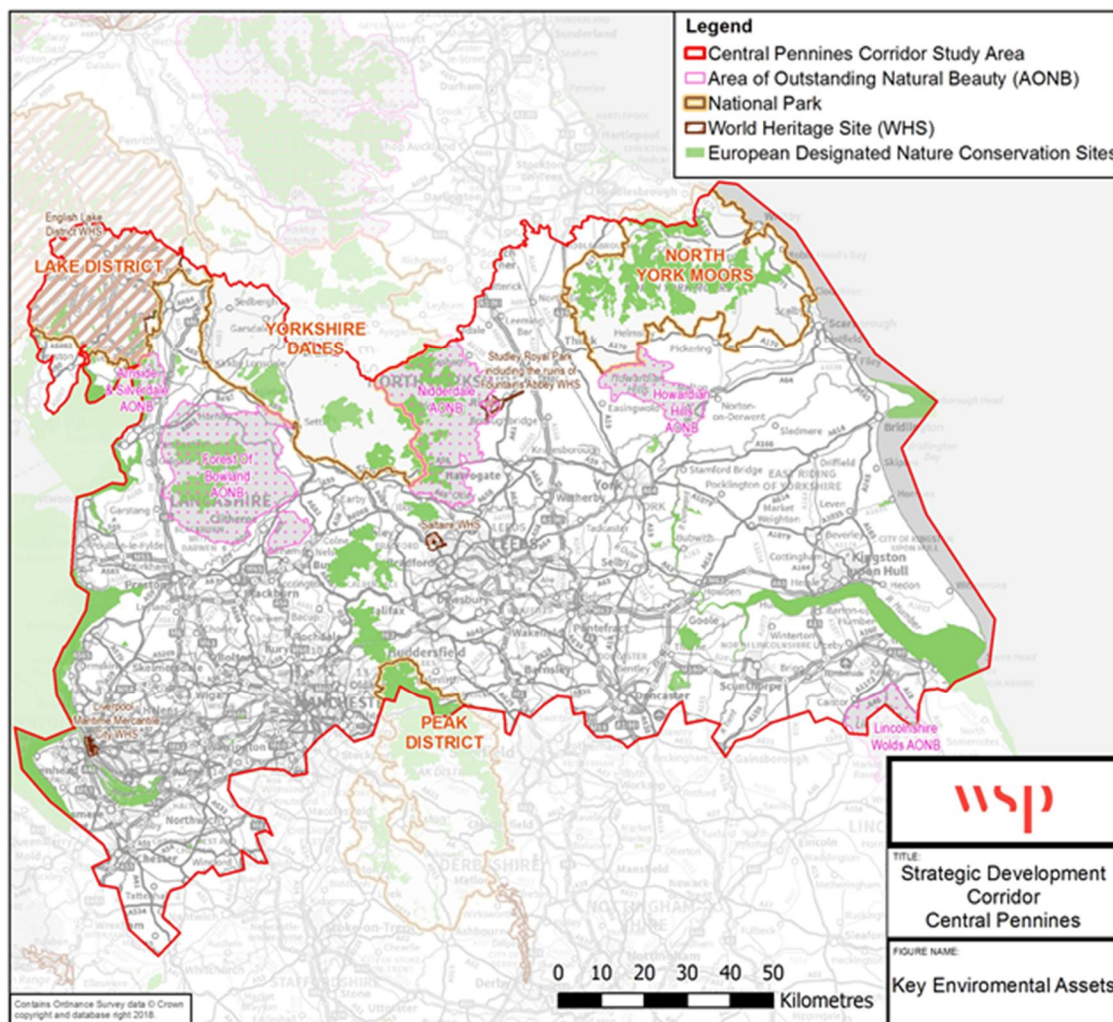
- Port of Hull: Road access to the port is via the A63 and onwards to the M62 motorway. A particular bottleneck on this route is the A63 Castle Street. Long-standing plans to upgrade this section of route are designed to improve access to Port of Hull, provided congestion relief, improve road safety and improved connections between the city centre to the north and developments, and tourist and recreational facilities to the south. The Port of Hull's rail connection has recently been upgraded to W10 gauge clearance to enable the movement of containers by rail to and from the port and now joins Immingham, Teesport and Liverpool in being able to move containers by rail.

## Environment

- 3.87 The Central Pennines corridor contains a number of important environmental assets which are highly valued at a local to international scale. Within the Corridor are four National Parks: Peak District, North York Moors, Yorkshire Dales and the Lake District. These landscapes cover 15% of the wider catchment study area and are valued nationally, regionally and locally as recreational resources for their natural beauty, wildlife and cultural heritage. The Corridor also contains five Areas of Outstanding Natural Beauty (AONB), a statutory designation given to landscapes highly valued for their visual amenity. Three Heritage Coasts also lie within the SDC; these stretches of coast are designated to conserve the best stretches of coast in England.
- 3.88 Features of historic importance are located throughout the Corridor; and include those protected by international, national and local designations. Of these, the most highly valued are World Heritage Sites: Studley Royal Park including the ruins of Fountains Abbey, Saltaire, Liverpool Maritime Mercantile City and the Lake District. A wide range of other historic and cultural heritage features are located throughout the corridor, spanning the full range of human settlement from prehistoric to the present. These include Registered Battlefields (17.4% of the total number in England), Scheduled Monuments, Registered Parks and Gardens and Listed Buildings.
- 3.89 Poor air quality impacts large parts of the study area. Currently 94 Air Quality Management Areas (AQMAs) have been declared in the wider study Corridor, with a city-wide AQMA in Liverpool. A large proportion of Greater Manchester and local areas surrounding sections of the motorway network have also been designated as AQMAs, including the M62 corridor south of Leeds. Even with improved emission characteristics of the national vehicle fleet, any further traffic growth has the potential to worsen these conditions. The pollutants causing "most concern" are nitrogen dioxide (NO<sub>2</sub>) and particulate matter – overwhelmingly caused by road transport – and are driving the development of Clean Air Plans, impacting a number of areas within the Corridor including parts of Greater Manchester and West Yorkshire.

3.90 Air Quality issues exist at ports with legislation in place to restrict the use of certain fuels to minimise outputs. There is potential to introduce shore-based power/‘cold ironing’ to reduce engines being run in port, but this requires new infrastructure and could increase pressure on the local grid.

Figure 21: Key environmental assets in the Central Pennines corridor study area



3.91 Throughout the Corridor there are a number of sites designated at the International (European) or National (United Kingdom) level for nature conservation purposes. Protected at the International level are Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Wetlands of International Importance (Ramsar) sites. 38 SACs, 19 SPAs and 14 Ramsar are located within the SDC. Many areas contain multiple designations; much of the North Pennine Moors and North Yorkshire Moors are designated as SAC and SPA. Of national biodiversity designations, there are also 537 Sites of Special Scientific Interest (SSSI) and 24 National Nature Reserves (NNR).

## Future Technologies and Societal Change

- 3.92 We are potentially at the start of profound change in how we move people, goods and services around. This is driven by innovation in engineering, technology and business models. The gathering pace of technological change through the delivery of higher speed and capacity digital networks, the connection and automation of vehicles, the adoption of robotics, zero emission propulsion, sharing of transport assets and new approaches to payment could transform the travel and the provision and management of infrastructure and services. Globally, nationally and locally, vehicle, infrastructure and service providers, across both the public and private sectors are investing in and adopting a range of new technologies and will disrupt current travel markets; however, the scale and timing of transformational change is unclear.
- 3.93 Furthermore, these disruptors to transport will not only affect the way transport networks are used, they will also shape whether and when people make journeys. The ability to operate remotely from the traditional work place, access health, education and other daily needs from home, and the ability to work while travelling may lead to shifting travel patterns and reductions in the need to make journeys during the established and narrowly defined weekday morning and evening peak periods.
- 3.94 There are significant variations in digital connectivity across the North. The fixed and mobile network coverage is primarily strong in the main centres, with the latter having greater coverage through the delivery of 4G into more remote areas. However, there is a considerable gap in connectivity the further away populations are from the North's main conurbations. This limits opportunities for e-commerce, home education and tele-working in areas already suffering from poorer levels of physical connectivity, damaging the North's ability to reach global markets from less connected areas.
- 3.95 The Infrastructure Commissions report into 5G and telecommunications technology suggested that high speed communications should be installed along all major transport corridors. With a digital backbone associated with road and rail networks, provided through fixed and mobile infrastructure facilitated by a number of providers, as well a consistent 'utility' of digital provision to all homes, business and centres for services, the true potential for hyper-connectivity can start to be realised. Major infrastructure upgrades implemented in the corridor should consider the potential to contribute to the 'digital backbone'.
- 3.96 The national transport infrastructure providers are continuing to roll out digital technologies to their networks with both Highways England and Network Rail delivering both operational and monitoring systems to provide efficiency improvements users. However, at the local level there are varying levels of uptake of digital and smart systems for network management and providing services to users. Furthermore, issues in the Corridor associated with transport connectivity and the associated environmental impacts may be reduced through technological advances in:

- Connected Vehicles;
- Automation and robotics;
- Zero emission propulsion;
- Shared assets;
- On account payment systems; and
- Additive Manufacturing.

3.97 Whilst uncertain, technology has the potential to reduce the demand for travel as well as enabling significant benefits to both those using the transport network and to network operators. Further work on transport interventions will need to take account of the potential impacts of technological and societal changes.

### Transport challenges and economic opportunities

3.98 The fundamental challenge for the North's economy is to improve the economic interaction between the key economic clusters and assets of the North to improve the sharing of knowledge, supply chains, resources, and innovation to drive agglomeration benefits and productivity. Physically connecting the North's towns, cities, economic centres and international gateways will facilitate this. It can also create agglomeration economies centred on areas of commercial and industrial specialisation.

3.99 There are distinct economic strengths in each of the SDCs that require support from future transport investment as well as important connectivity challenges that need to be overcome, if the North as a whole is to deliver transformational growth. While significant investment in transport infrastructure is currently planned for the region, there is a need for a programme of further Pan-Northern investments to maximise and realise the opportunities from the major transformational infrastructure projects such as HS2 or NPR.

3.100 Better transport connectivity increases the physical proximity of firms, workers and consumers and concentrates economic activity into clusters. Improving transport connections between the North's cities, towns, economic centres, infrastructure and assets allows for greater opportunities. This will be supported by a strong logistics industry. This section presents the key transport challenges and economic opportunities that can be realised with a programme of investments in the Central Pennines SDC.

Connecting People: Connectivity between the North's economic assets and clusters in the Central Pennines

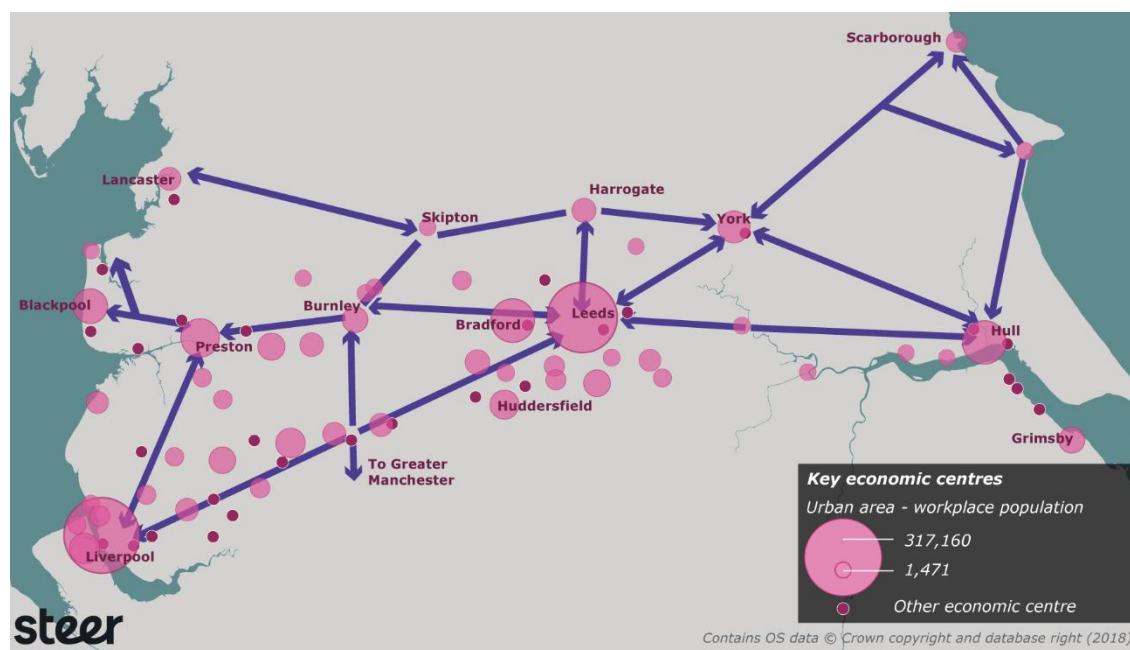
3.101 The North's transport system needs to be accessible, resilient, safe, well-maintained and accommodating for the free-flowing movement of people for work, leisure, education and other personal business trips. Better transport links make jobs more accessible, provide greater choice and can deliver a better quality of life.

3.102 This will also help the North's deprived areas reach their full economic potential. For an employee seeking work, better links increase the number and range of jobs and career opportunities available. For an employer,

better connectivity increases the ability to access and compete across a larger labour market catchment area.

- 3.103 Travel to work analysis (previously shown in Figure 12) indicates that within the Corridor labour markets are geographically proximate but are currently economically detached/self-contained, constraining the Corridor’s economic potential. This limited reach of labour markets means that Northern workers have reduced job opportunities, and Northern employers have much smaller labour markets. This is holding back wages and productivity and makes the North a less attractive place for businesses.
- 3.104 Improved connectivity to Important Economic Centres, shown in Figure 22, will assist with increased engagement in the labour market, access to skills and improved interaction between centres. A relatively small proportion of the North’s population commutes by rail. This is due to factors such as the cost, convenience and perception of the rail network, as well as capacity constraints on both intra and inter-urban rail services. Many of the current journeys between Northern economic assets and clusters are slow and infrequent, both in absolute terms and compared with journeys to and from London. For example, it currently takes longer to travel by rail between Liverpool and Hull than it does to travel twice the distance between London and Paris.

Figure 22: Important Economic Centres in Central Pennines SDC



- 3.105 The North’s towns and cities also act as significant attractors to visitors, along with national parks, seaside resorts and coastal attractions. The latter are at the periphery of the North’s transport network and the most susceptible to incidents on the network.
- 3.106 Increasing the visitor economy will require easy and accessible transport connections so that national and international visitors can access attractions across the North. Improved connectivity would enable more visitors to

travel directly to the North, making it more likely that they will spend more time and money here. With improved local, regional and international connectivity, the number of visitors and tourist trips to the North could be greatly increased.

- 3.107 At the same time, it is vital that the transport network does not restrict tourism. Opportunities to enhance the built and natural environment through a carefully designed and operated transport network should be seized.
- 3.108 The tourism sector represents the third largest employer within the UK, accounting for 9.5% of total employment. There are 265,000 businesses associated with tourism, which account for 10% of all businesses in the UK. Within the regions that encompass the north, nearly 350,000 people are directly employed by the tourism industry. The number of visitor trips made to the North as a whole, North West and North East relative to the UK is provided below:

Table 4 Visitor trips made to the North as a whole, North West and North East relative to the UK<sup>50</sup>

Region	Day Visits (£m)	%	Domestic (£m)	%	Inbound (£m)	%	Total (£m)	%	Direct Employment	%
North	7,647	14.5	3,081	13.6	1,546	7.3	12,302	12.7	227,817	12.7
North East	2,277	4.3	616	2.7	216	1	3,116	3.2	57,704	3.2
North West	5,370	10.2	2,465	10.9	1,330	6.3	9,186	9.5	170,113	9.5
<b>UK Total</b>	<b>52,848</b>	<b>100.0</b>	<b>22,549</b>	<b>100.0</b>	<b>21,027</b>	<b>100</b>	<b>96,724</b>	<b>100.0</b>	<b>1,789,333</b>	<b>100.0</b>

- 3.109 In 2014, tourism in the North West and Yorkshire directly employed 290,000 people, and had a value of £15,680 million. Key destinations within the Central Pennines SDC include:
- The Fylde Coast is a key tourist destination in the North-West. Blackpool is the UK's most visited seaside resort. Lancashire attracts 67 million visitors who generate £4.13 billion revenue and supported over 59,000 jobs, with just over half generated in Blackpool, Fylde and Wyre;
  - Liverpool City Region's visitor economy supports over 51,500 jobs and generates income in excess of £4.3 billion. Liverpool is the fifth most visited city in the UK for international visitors. Liverpool has more museums and galleries than any other UK city region outside of London, with a rich musical heritage and strong sporting and event destination;
  - Greater Manchester's visitor economy is worth £7.5 billion and supports 92,000 jobs. Manchester is the UK's second most visited city destination and third most visited city destination by international visitors – 23% of Manchester's staying visitors are international. Business tourism makes a considerable contribution to the prosperity of Manchester through, for example, national and international conferences. Its strengths include its nightlife and sports & entertainment events.

<sup>50</sup> Source: Tourism: Jobs and Growth, VisitBritain/Deloitte, 2013 & Deloitte, 2013, DETI, Inter Departmental Business Register 2014.



- Leeds attracts over 27 million visitors annually from both the UK and abroad, and is the third best shopping destination in the UK outside of London.
- Harrogate district is a vibrant visitor destination that attracts around five million business and leisure visitors per annum, and is home to the Harrogate Convention Centre, the UK's third largest integrated conference and exhibition centre.
- York has evolved into an internationally renowned visitor destination enjoying a strong and diverse economy, bringing in well over 4 million visitors annually to enjoy what is on offer, which generates £363 million locally. York offers a wealth of historic attractions, of which York Minster is the most prominent, and a variety of cultural and sporting activities making it a popular tourist destination.
- An average of 1.4 million people visit the North Yorkshire Coast every year and more people visit the Yorkshire Coast than any other part of England outside of London<sup>51</sup>. Scarborough is the largest holiday resort on the Yorkshire coast. More than £0.5 billion was spent by tourists in Scarborough in 2014.

3.110 The corridor provides access to a number of designated high value landscapes which are important to the visitor economy including: the Yorkshire Dales, North York Moors and Peak District National Park; the Forest of Bowland, Howardian Hills and Nidderdale AONBs and the Flamborough Headland heritage coast.

Connecting People: Supporting the international connectivity of the Central Pennines

- 3.111 International connectivity and accessibility is important to support a dynamic Northern economy. A significant contribution to GVA would be achieved if more international tourism and business trips were made directly to the North's ports and airports. Enhanced connectivity to global markets are closely linked to levels of foreign direct investment.
- 3.112 Overall, some 44 million air passengers were carried on flights to/from the North's airports in 2017, around 15% of the UK total.
- 3.113 The largest proportion of air passengers consists of outbound leisure trips, which contributed around £0.5 billion to GVA in 2016. Whilst the North currently accounts for around 25% of the UK's population, its seven airports handle around 15% of all airport passengers in the UK. This suggests a degree of underperformance in the connectivity provided given the relative scale of the population and economic base.
- 3.114 In the corridor there is a need to address connectivity gaps in relation to surface access to Leeds Bradford and Liverpool airports both of which play an important role in serving their local city regions, neighbouring

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<sup>51</sup> Visit England's figures for the period 2013 to 2015, are based on the Borough of Scarborough, including Filey, Whitby and parts of the North York Moors National Park.

geographies and beyond, providing enhanced international connectivity. The resilience and reliability of links connecting the corridor with Manchester Airport also requires improvement.

Figure 23: Annual passenger movements and percentage of UK total<sup>52</sup> for the Central Pennines SDC



- 3.115 Improved international connectivity will also benefit the wider supply chain and visitor economy across the North, as well as creating agglomeration effects from faster, more reliable connections between key areas of employment, with £2 billion spending by 4.5 million overseas visitors. Increasing the visitor economy will require easy and accessible transport connections so that national and international visitors can access attractions across the North – in 2016 26.3 million domestic visitors spent £4.8 billion.
- 3.116 Ultimately, if more passengers can access the North’s airports by road and rail within 1 to 2 hours, then more airlines are more likely to introduce new European and Intercontinental services from the North’s airports. This drives an increasingly competitive market whilst providing more choice and opportunity for passengers.

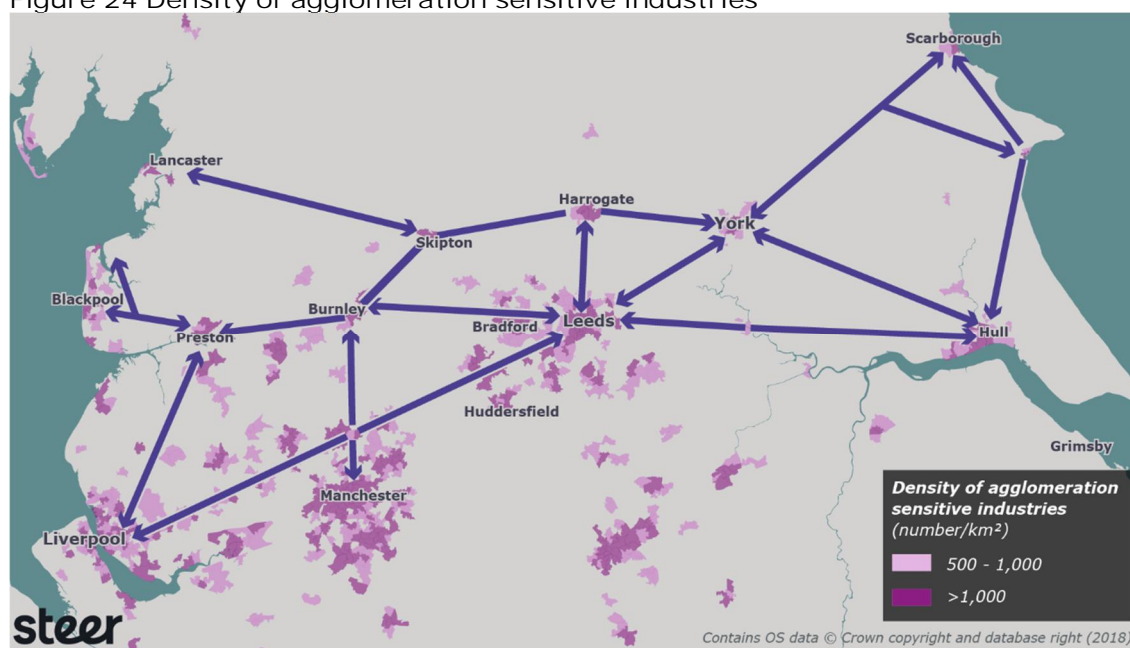
Connecting Businesses: Connectivity between the North’s economic assets and clusters in the Central Pennines

- 3.117 Sustainable economic growth can occur when businesses, employees and customers are better connected through transport. The industries identified as the four prime and three enabling capabilities within the NPIER, as well as businesses in the wider economy, are spread across the North.

<sup>52</sup> Source: Based on UK Civil Aviation Authority - rolling year ending October 2017; and DfT UK international and domestic sea passenger crossings (excluding passengers temporarily disembarking ‘port calls’ in the UK), 2017

- 3.118 The Central Pennines SDC provides connections to: the majority of the major cities in the North; key international gateways at Manchester Airport, Port of Liverpool and the Humber estuary ports; and dense areas of employment in agglomeration sensitive industries, see Figure 24.
- 3.119 Beyond local areas, transport links to other parts of the North and the UK are critical to local long-term success. Pan-Northern transport improvements will support the economy through multiplier impacts, providing enhanced connectivity between adjacent functional economic areas, and to shared Northern, national and international gateways. This transformation of Pan-Northern connectivity can in turn result in improved local connectivity, delivering economic and social benefits.

Figure 24 Density of agglomeration sensitive industries



- 3.120 The corridor contains significant sets of clusters in key sectors which have the potential to compete on the national and international scale. These include:
- Advanced manufacturing, aerospace and automotive clusters in Lancashire;
  - Advanced manufacturing, vehicle manufacturing, energy and health innovation capabilities in the Atlantic Gateway, Liverpool City Region, Hull and Humber;
  - Agricultural food production and food industry in York, North Yorkshire and the East Riding of Yorkshire, Hull and Humber, West Lancashire and Leeds City Region;
  - The energy industry in Lancashire, Hull and Humber, and North Yorkshire;
  - Digital clusters in the Liverpool, Greater Manchester and Leeds city regions;
  - The North's university and higher education institutions;

- The professional service sectors located in all the Corridor’s towns and cities, with concentrations in Leeds and Greater Manchester city regions; and
- The freight and logistics sector, serving businesses via the North’s ports, airports and inland distribution facilities.

3.121 Many of these clusters have supply chains that rely on good connectivity within the North, for example, Figure 25 shows BAE Systems’ procurement spending by local authority district in 2016.

Figure 25 BAE Systems’ procurement spending by local authority district, 2016<sup>53</sup>



3.122 Transformational growth projections forecast material increases in highway and rail trips. Underlying these economic growth forecasts are assumed supporting improvements in the northern transport network. Without such intervention, the forecast growth will not occur; poor road and rail connectivity between economic assets and clusters in the Central Pennines SDC is affecting the capability of these clusters expanding and preventing the growth in supply chains. This is also true for a number of economic assets and clusters outside the urban cores.

3.123 In the absence of intervention, the growth that does occur is more likely to be focused on the highway network – which has considerably more capacity than rail – and benefits would be less well distributed.

3.124 East-west transport connectivity is vital for this corridor to connect between the relatively closely located centres, particularly in terms of journey time reliability and capacity, as reinforced during stakeholder engagement. The IER considers the development of the east-west rail corridor in particular to have the potential to be transformative for the Northern economies connecting the ‘Core Cities’ of Liverpool, Manchester, Bradford, Leeds, and Hull, and beyond. For employment in city centres to grow to the maximum

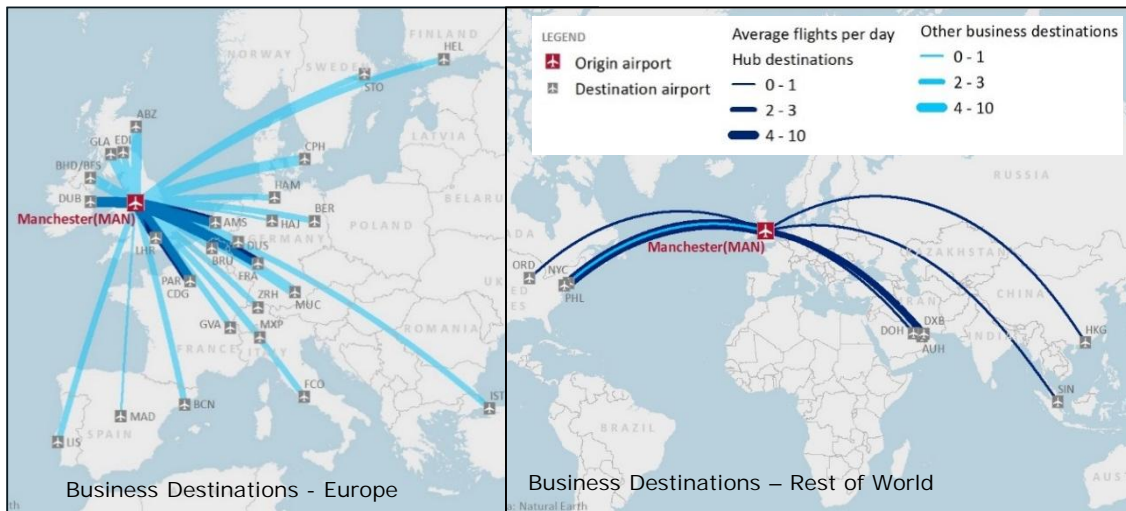
<sup>53</sup> <https://www.baesystems.com/en/feature/uk-economic-contribution>

extent and the full scale of agglomeration benefits realised, it will need to be accommodated by enhanced public transport connectivity due to space constraints on both inter-city links and within cities at origin and destination points.

**Connecting Businesses: Supporting the international connectivity of the Central Pennines**

- 3.125 There were around 2 million return business-related air trips to and from the North in 2016, with £5 billion of GVA in the North currently from air passengers derived from business productivity brought about through direct international air connections to and from the North’s airports.
- 3.126 A key challenge is to attract more businesses to take advantage of the North’s prime and enabling capabilities. To achieve this, it needs to be easier, cheaper, faster and more reliable to travel to and from the North’s gateways.
- 3.127 In terms of connectivity between adjacent areas, good connectivity between the Corridor and Manchester Airport is vital in providing long haul routes not provided by Leeds Bradford or Liverpool airports. Foreign investors are more likely to be attracted to locations that are well connected to global markets and that have access to a well-qualified workforce.

Figure 26 Manchester Airport Business/Hub Destinations



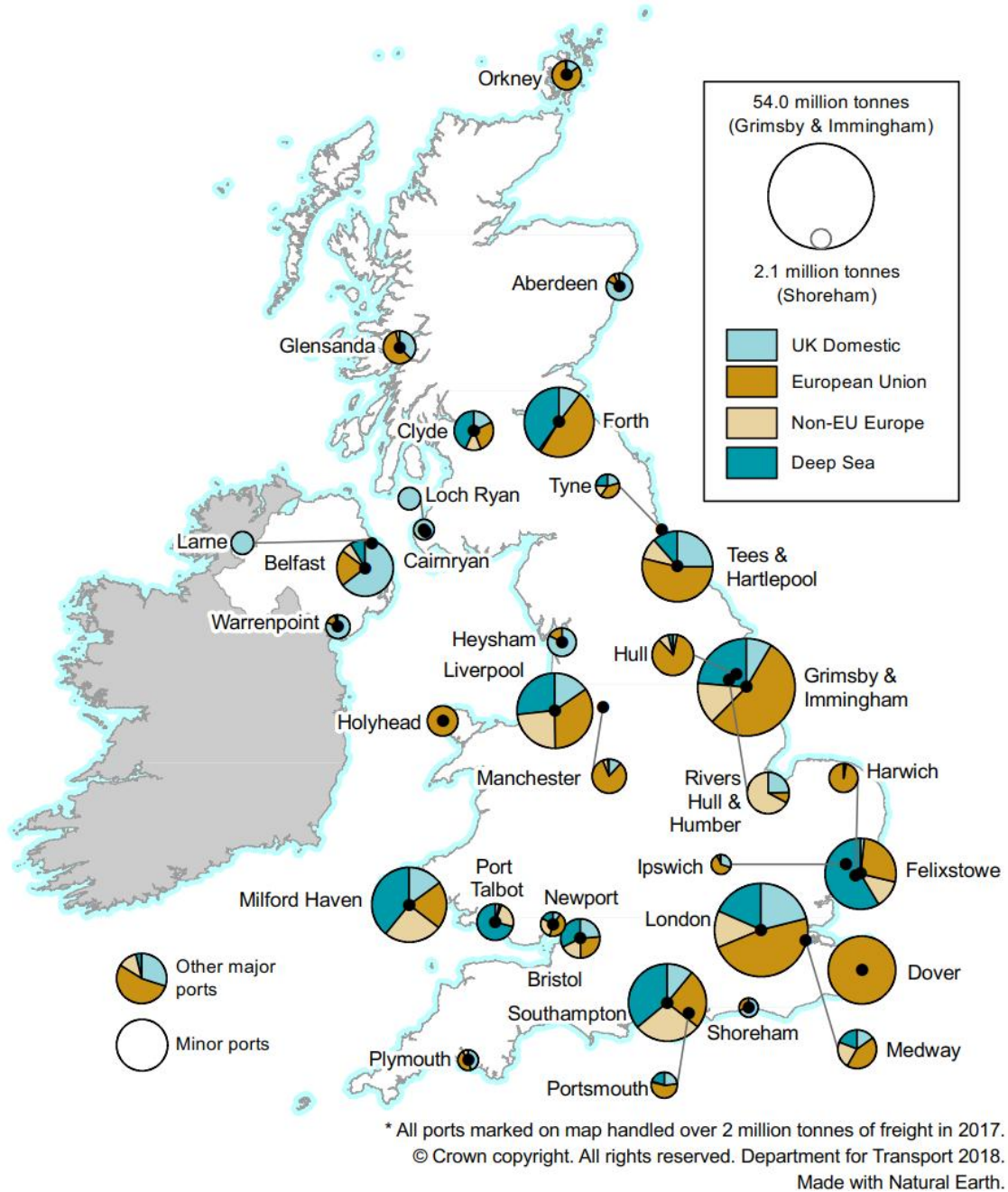
- 3.128 Easier access to the North’s airports can also support additional economic growth by enabling increased development of sites near or adjacent to the North’s airports. LJLA and LBIA are major employers in the Corridor, contributing £115 million and £336 million GVA yearly to the regional economy and 2,700 and 2,350 direct jobs respectively.

**Moving Goods: Connectivity between the North’s economic assets and clusters in the Central Pennines**

- 3.129 The Central Pennines Corridor is the main corridor that will benefit from the Ports of Liverpool and the Humber Ports being better connected. This is because the concentration of warehousing in the corridor is such that the

goods and materials handled at the ports can be processed then exported or moved elsewhere. At the UK level, approximately a third of freight tonnage uses ports in the North, and contributing nearly one fifth of the GVA (£4.4 billion, in 2016).

Figure 27: UK Major Ports – Domestic and International Annual Freight Tonnage<sup>54</sup>



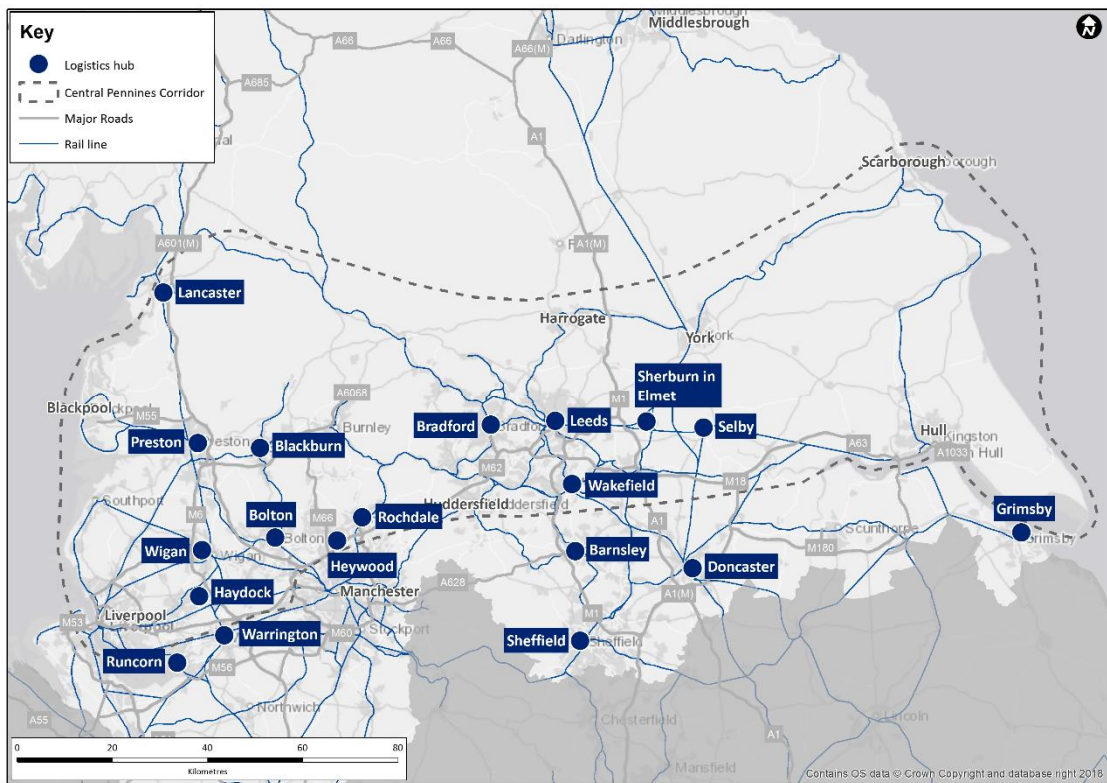
3.130 In addition to dedicated freight and logistics companies within the North, freight movements are an important part of supply chains for most businesses including the North’s prime capabilities. The North has a significant amount of distribution centre capacity covering all types of

<sup>54</sup> Source: DfT UK Port Freight Statistics, 2017 (Statistical Release August 2018)

warehousing, a large proportion of this is located in the west of the study area, see Figure 28.

- 3.131 The growth of the online retail sector is putting enormous pressure on the transport infrastructure as the volume of goods being delivered increases and the expected service level requires same or next day deliveries. Road freight is often inherently less expensive to handle goods by road, by comparison with rail freight, since it is free at the point of access, not restricted to a timetable, and there are lower handling charges. However, a more congested, less reliant road network could hinder this.
- 3.132 As the economy grows, so will the demand for goods and consequently the movement of goods. These increases will put additional pressure on the already constrained key links such as the M62.

Figure 28 Logistics Hubs



- 3.133 The *Enhanced Freight and Logistics Analysis*<sup>55</sup> considers the future of road freight operations, where new technologies including Connected Autonomous Vehicles stand to revolutionise the movement of goods and has the potential to deliver improvements in emissions levels across the North.
- 3.134 Currently, the commodities that arrive at Northern ports stay primarily within the North, with the biggest flows to and from the ports using east-west routes. Biomass represents a significant market for the Northern ports, with Liverpool and Immingham handling large volumes to support

<sup>55</sup> Source: TfN *Enhanced Freight and Logistics Analysis*, January 2018

Drax, which generates 8% of the UK's electricity. To see the Northern ports' opportunities maximised, there needs to be strong connectivity to and from them via the major transport networks.

- 3.135 Investment in Liverpool2 and continuing growth of the Humber Ports has given strength to the concept of a rail freight "superhighway" connecting Liverpool and the Humber, as well as wider benefits for freight movement across the North to other ports. This concept is endorsed by IPPR North and supported by the Northern Ports Association, enhancing engagement with freight businesses that are not as strongly aligned to the ports in other ways. This will assist Northern Ports with being more competitive with the ports in the South, currently 60% of freight destined for the North of England is delivered to southern ports, which is currently putting unnecessary pressures on north-south routes and corridors.
- 3.136 Where modal shift from road to rail may not currently be seen as economically viable, there is the opportunity to create the right conditions for a paradigm shift in the way that freight is viewed in the North. To achieve this, freight routes must be direct and not circuitous which is a significant constraint at present. Freight routes and paths must be planned alongside passenger rail not as an afterthought.

#### Moving Goods: Supporting the international connectivity of the Central Pennines

- 3.137 Air freight has a significant economic value, and industries that rely on transporting high-value goods quickly around the globe (for example just-in-time services) depend on it. Whilst 11% of air freight is customs cleared in the North, only 4% is flown from one of the North's airports (94% from Manchester). This reflects the dominance of the direct, long-haul passenger flights that provide most of the air freight capacity.
- 3.138 There is the capability to have all air freight with an origin or destination in the North, flying from the North's airports, compared with just 4% in 2016. Increasing the North's direct long-haul air connections will increase its air freight capacity, meaning that fewer goods need to be transported across the UK. In turn, this could reduce congestion and road-based carbon emissions on north-south corridors.
- 3.139 The North and its airports and ports could increase their capacity to handle freight by both air and sea. The Independent International Connectivity Commission was of the view that securing more direct long-haul passenger services would increase capacity for high-value, time sensitive air freight. This would enable businesses in the North to make full use of international gateways, trading more directly and effectively with Partners around the world. Greater use of coastal shipping and inland waterways would also improve the North's ability to move freight more efficiently than at present. In respect to ports, Liverpool2 used to be able to handle just over 3% of the world's ships due to constraints in handling ship sizes. It can now handle up to 97%. Port Salford can play an important role in delivering



improved global connectivity to Greater Manchester and beyond due to its potential role as part of the infrastructure of global supply chains.

- 3.140 For the end-to-end freight journey to be as efficient as possible, the North needs better surface access to ports, airports, and intermodal terminals – enhancing the “first and last mile” of these journeys, and in turn creating better road connections and additional rail freight paths.

#### Supporting the Built/Natural Environment

- 3.141 The transport industry accounts for 24% of the UK’s greenhouse gas emissions. The North’s dependence on travel by private vehicle, due to the lack of alternatives, perpetuates this significant contribution to greenhouse gases within the study area - per capita levels of carbon dioxide emissions related to transport are particularly high in Hull, Leeds, Bradford, Oldham, Blackburn with Darwen, Sefton and Blackpool. Improved efficiency on the highway network and investment in rail will assist with reducing this global pollution.
- 3.142 Many of the built-up areas within the study area have identified air quality issues, directly linked to transport emissions. There are 94 designated AQMAs in the study area, including:
- Liverpool city-wide AQMA;
  - Majority of the road network in Greater Manchester; and
  - M62 corridor south of Leeds.
- 3.143 Promoting and supporting the natural environment and built environment with respect to sustainable travel options associated with the major transport networks will be a key opportunity and necessity of future transport initiatives.
- 3.144 Reducing carbon emissions and improving air quality is now a central requirement for the transport, freight and logistics sector. The UK's Clean Growth Strategy includes the aim to collaborate with the industry to reduce the impact of freight emissions and improve air quality across all transport modes. There is a need to investigate and understand the different options for the corridor to move towards delivery of alternative fuelling and operation.

### Summary of Transport Issues

- 3.145 There is a need to provide enhanced, additional road and rail capacity across the Pennines to provide alternatives to existing routes and to open up new opportunities. Across the corridor there is a diverse mix of strategic movements to cater for. Freight and logistics support the ports, airports and inland ports as well as servicing the businesses located across the corridor. Improving connectivity would accelerate increased employment, new housing developments, and increase the scale of the overall growth opportunity.
- 3.146 There is currently strong road and rail demand between Liverpool, Manchester and Leeds, with demand exceeding the current capacity on the

rail network and the M62, with alternative connections along this corridor not providing a strong alternative movement option. For the rail network, growing the capacity of key hubs, including Manchester, Leeds and York is crucial to releasing the potential of individual rail routes within the corridor.

3.147 The desired transport outcomes that need to be focussed on in the corridor include:

- Enhance east-west connections across the North to support UK competitiveness including:
  - § Improving Liverpool to Hull east-west network resilience across all modes
  - § Improving east-west Trans-Pennine connectivity and journey times across all modes
- Enhance north-south connections across the North to support UK competitiveness including:
  - § Improving Liverpool to Preston north-south network resilience across all modes
- Enhance access to the North's international gateways in the corridor, including:
  - § Improving access to Port of Liverpool, Port of Hull, Liverpool John Lennon Airport and Leeds Bradford International Airport by all modes
  - § Maximising the use of Manchester Ship Canal as an asset and reducing its impact as a barrier to travel
- Ensure the North is ready is for HS2 to maximise the benefits of this nationally significant project including:
  - § Improving rail journey times between Southport and Wigan
  - § Improving rail journey times between York and the East Coast
  - § Improving rail service frequencies between Ormskirk and Preston
- Enhancing connectivity between the North's largest economic centres with faster more frequent services, to be on HS2 including:
  - § Northern Powerhouse Rail
  - § Improving the major hubs necessary to realise the benefits of improved connectivity along the NPR corridors including: York, Manchester Piccadilly, Liverpool Lime Street, Bradford and Leeds stations
- Improve connectivity and resilience to tourism and economic clusters on the Fylde Coast economic cluster including:
  - § Improving journey times, reliability and rail service frequency between Blackpool and Preston
  - § Enhancing public transport links to Fleetwood
- Improve connectivity and resilience around the Humber, Liverpool City Region, Greater Manchester City Region, Lancashire and Leeds City Region economic clusters including:
  - § Improving Liverpool to Preston reliability and journey times by all modes
  - § Improving public transport connectivity between Rossendale and Manchester

- § Improving journey times and reliability between East Lancashire and Manchester by all modes
- § Improving journey times and rail service frequencies between Colne and Accrington
- § Improving rail journey times and reliability between Bradford and Leeds
- § Improving journey times and rail service frequencies between Leeds – Harrogate and Harrogate - York
- § Improving journey times, reliability and rail service frequencies between Hull and Scarborough
- Facilitate the delivery of housing growth of strategic significance by all modes

3.148 In addition, the following Pan-Northern outcomes have been identified which would benefit the corridor:

- Increase provision for Northern Ports and Trans-Pennine freight traffic
- Increase intermodal freight provision
- Funding support to bring new intermodal services in to operation
- Enhance digital connectivity across the major road network and rail network
- Better use of technology to increase efficiency of the rail and road systems
- Better use of data/ technology to manage freight demand and integration of rail paths
- Better integrated travel
- Improve how people and goods move and travellers' customer experience
- Reduce the environmental impact from transport
- Improve affordability of travel

## 4 The Need for Intervention

### Introduction

4.1 The Need for Intervention builds on the Case for Change set out in Chapter 3. It focusses on the problems and opportunities identified as being key to the unlocking of transformational growth. It firstly shows why investment is needed beyond the schemes assumed to be delivered in the Reference Case. It then identifies why TfN is the appropriate promoter for the additional infrastructure investment required and what objectives, subordinate to TfN's STP objectives, TfN aims to achieve with a programme of investment in the Central Pennines SDC.

### Why further investment is needed

4.2 Across the North there are both physical (such as highway connectivity, journey times and reliability) and economic barriers restricting trade and business interactions. These barriers limit clustering of businesses, i.e. agglomeration economies, causing under-utilisation of the potential

knowledge/innovation spill-overs resulting from improved efficiencies. When the transformational growth is factored in, synergies between road and rail will be critical to addressing these challenges and opportunities, as will an understanding of how transport demands will change in the future.

- 4.3 In a 'transformed future' scenario, the Northern economy would become more productive partly through increasing the skills of its workforce and lowering levels of economic inactivity - both these factors are associated with an increased propensity to travel. All other things being equal, increased productivity would therefore be expected to lead to marked changes in both the travel patterns of individuals and aggregate patterns across the entire North.
- 4.4 Under the transformational scenario, growth is expected in high and medium-skilled occupations (an increase of 35,300 and 1,600 jobs per annum by 2050 respectively), while jobs in low-skilled occupations are expected to stabilise from 2030 after a decline since 2015. In a transformed North, by 2050:
- total demand for rail travel is expected to be up to four times higher than today, to around 760 million trips.
  - total demand for road travel is forecast to increase by up to 54% by 2050, to around 193 billion vehicle km travelled.
- 4.5 The major transformational infrastructure projects included in the Reference Case (including HS2, NPR, Northern Trans-Pennine Routes, Trans Pennine Tunnel and Wider Transport Connectivity Assessment and Manchester North-West Quadrant), are focussed on delivering improved connectivity between the North's city regions. A significant proportion of the growth catalysed by these projects will therefore be focussed on major towns and cities. To achieve transformational growth across all parts of the North, not just in the large urban conurbations, and realise the necessary rebalancing of the northern and UK economies will require further transport intervention.
- 4.6 Building on these foundations, the SDCs represent an economic area where the evidence to date indicates most progress towards the transformational growth scenario would be made by bringing forward Pan-Northern road and rail investment over the lifetime of the STP, with investment in all corridors critical in achieving TfN's and Partners collective ambitions.

### Why TfN is the appropriate promoter

- 4.7 TfN's remit is focused on the identification and recommendation of strategic transport interventions, which generally support longer distance trips and have a pan-northern impact. TfN will also work with partners to support complementary investment at a local level to ensure that a 'whole journey' and 'total network' approach to improving transport is followed.
- 4.8 There is no other authority or organisation with a remit that would make them an appropriate alternative; which is not to say that Highways England

and Network Rail, which come closest, would not have a role in delivering interventions.

### The sub-objectives of the SDCs

- 4.9 Subordinate to the four objectives set out in the STP, a set of sub objectives were set at the SDC level, to ensure that TfN's aims for investment are achieved. These sub objectives were developed in consultation with stakeholders, including one to ones with industry, to support both the STP's objectives and the aspirations for Pan-Northern interventions. Sub objectives underwent a rigorous process of approvals including Technical Assurance Group (TAG) and SDC Project and Programme Boards.
- 4.10 These sub objectives are set out in the following table together with their performance measures.

Table 5 SDC Sub-objectives

STP Objectives	Sub Objectives	SDC Performance Measures
Transforming the economic performance	Improving productivity across the North	Does the scheme improve the connectivity for people and/ or goods?
	Improving links between the North's ports, airports, and strategic transport interchanges and the major transport networks for people and goods	
	Supporting, informing and influencing present and future land-use development in the North	Does the scheme improve accessibility to [any of] the North's four prime capabilities?
Increase efficiency, reliability, integration and resilience in the transport system	Improving efficient operational performance of existing major transport networks	Does the scheme improve the throughput of existing transport networks?
	Increasing the capacity and capability of the major transport networks for people and goods	
	Improving the reliability of the major transport networks for strategic transport movements of people and goods	Does the scheme improve the predictability of journey times?
	Improving travel choices and user experience for the movement of people and goods across the North	Does the scheme improve customer/ driver experience including via increased choice?

STP Objectives	Sub Objectives	SDC Performance Measures
	Increasing the resilience of major transport networks	Does the scheme improve the resilience/ recovery of major transport networks?
Promote and enhance the built, historic and natural environment	Improving sustainable travel options and making best use of the North's existing major transport network. Supporting the reduction of transport-related Greenhouse Gas (GHG) emissions and improvement of air quality across the major transport networks	Does the scheme increase use of sustainable travel options associated with the major transport networks and reduced transport-related emissions (CO2, NOX, PM)?
	Reducing the impact of transport on local communities and environmentally sensitive areas	Does the scheme reduce the impact of transport in environmentally sensitive areas? Does the scheme reduced the impact of transport on local communities?
Improve inclusivity, health, and access to opportunities for all	Supporting the delivery of Transformational Infrastructure and employment projects	Does the scheme improve access to economic assets of National of Pan-Northern significance?
	Supporting and enhancing the visitor economy	Does the scheme improve access to major tourist destinations?
	Supporting and enabling the delivery of strategic housing sites	
	Supporting an affordable inclusive transport network with enhanced access to key opportunities, education and skills.	Does the scheme improve integration with local transport networks?
	Improving integration and coordination with local transport networks	

## 5 Wider Context

### Introduction

- 5.1 This section summarises the wider context of the proposed programme of interventions for the Central Pennines corridor. By outlining the programme's delivery constraints, as well as interdependencies with other implemented or planned projects as well as wider stakeholder needs and views, this section aims to provide a bigger picture with regards to the ease of implementation, its relation to other projects and the wider public opinion.

### Delivery Constraints and Opportunities

- 5.2 A number of specific and more general constraints have been identified that may affect the delivery of the programme.

#### *Transport Model Limitations*

- 5.3 The future travel market scenarios available for use in the transport modelling are as follows:
- National Trip End Model (NTEM) Core – in line with WebTAG guidance;
  - NTEM Core with spatial plans and TEMPRO constrained at LEP level;
  - NTEM Core with IER land use uplift, constrained at LEP level; and
  - Northern Transport Demand Model (NTDM) derived transformational high growth.
- 5.4 Transport modelling has focussed on the NTEM Core scenario during this stage of work. Plans are currently being made to resolve technical issues experienced with additional scenarios through follow-on commissions.
- 5.5 Notwithstanding, the NTEM Core scenario represents a lower travel market than TfN's transformational growth demand forecasts in terms of volume of movements and can therefore be seen as a conservative representation of the benefit to cost ratio (BCR) for a given intervention /programme of interventions.

#### *Environmental*

- 5.6 The Central Pennines SDC includes 41 different National Character Areas (NCA). Designated high value landscapes within the Central Pennines SDC include National Parks, AONB and Heritage Coasts.
- 5.7 Poorly located or designed transport infrastructure has the potential to degrade existing landscape character and visual amenity.
- 5.8 By the nature of the Pennines (which contain designated and non-designated landscapes including the Peak District and Yorkshire Dales National Parks) running north-south through the centre of the SDC and covering a significant part of the SDC, any efforts to improve east-west connectivity or local or regional connections within the Pennines and its fringes will risk significant adverse landscape impacts.

## Interdependencies

### *Reference Case*

- 5.9 As set out in the reference case definition, the basis against which the programme of interventions in the Central Pennines SDC is assessed includes some improvements which are not yet committed. Therefore, the basis of the assessment and conclusions reached in this SPOC are dependent on implementation of the reference case. That is not to say the programme does not have benefits in its own right, however, this has not been examined as part of this early stage of development work.

### *Major Transformational Infrastructure Projects*

- 5.10 Part of the rationale for the SDCs is to build on and extend the benefits of other significant investments in TfN's wider programme. Schemes such as NPR would benefit from the implementation of the proposed programme of intervention. As the major transformational infrastructure projects and SDC projects target the improvement of inter-city transport links, it can be expected that complementary benefits can be achieved. Furthermore, as HS2 is expected to function as an additional catalyst for NPR<sup>56</sup>, the integration of both projects with the proposed programme of SDC interventions will have additional complementary benefits. That is not to say the programme does not have benefits in its own right; however, this has not been examined as part of this stage of work.
- 5.11 An overarching programme perspective is required to ensure the view of these complementary benefits is retained as various packages and interventions move forward in the delivery process.

### *Wider Policy Context*

- 5.12 The proposed programme of interventions is not only closely aligned with key national, regional and local policies, but it is also expected that these policies are interdependent with regional interventions as suggested here. Notably, the programme of interventions will also lead to strong complementary benefits for non-transport policies.
- 5.13 Key national non-transport policies and strategies such as the UK Industrial Strategy or the Making our Economy Work for Everyone report<sup>57</sup>, also identified the need for investing in strategic infrastructure to improve the country's productivity and increase economic growth and overall wellbeing. As a result, it is expected that the proposed programme of interventions will play a central complementary role for achieving the objectives of these strategies.

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<sup>56</sup> Global Railway Review (2018)

<https://www.globalrailwayreview.com/news/67419/hs2-npr-ambitions-greater-manchester/>

<sup>57</sup> *ibid*



5.14 The NPIER identified poor connectivity and transport as one of the factors driving the productivity gap in the North. Forecasts anticipated that a 'transformed' North, where there were improvements to transport connectivity, as well as the skills base and innovation, would lead to an additional 850,000 jobs, 4% Increase in productivity and a GVA 15% higher than a business as usual scenario.

*Business Case and Funding Approval*

5.15 The costs associated with the development and construction of the programme are significant and the programme is currently in the early stages of business case development. To secure any government funding toward the scheme the DfT's Transport Business Case process will need to be adhered to. This SPOC is the first step, followed by:

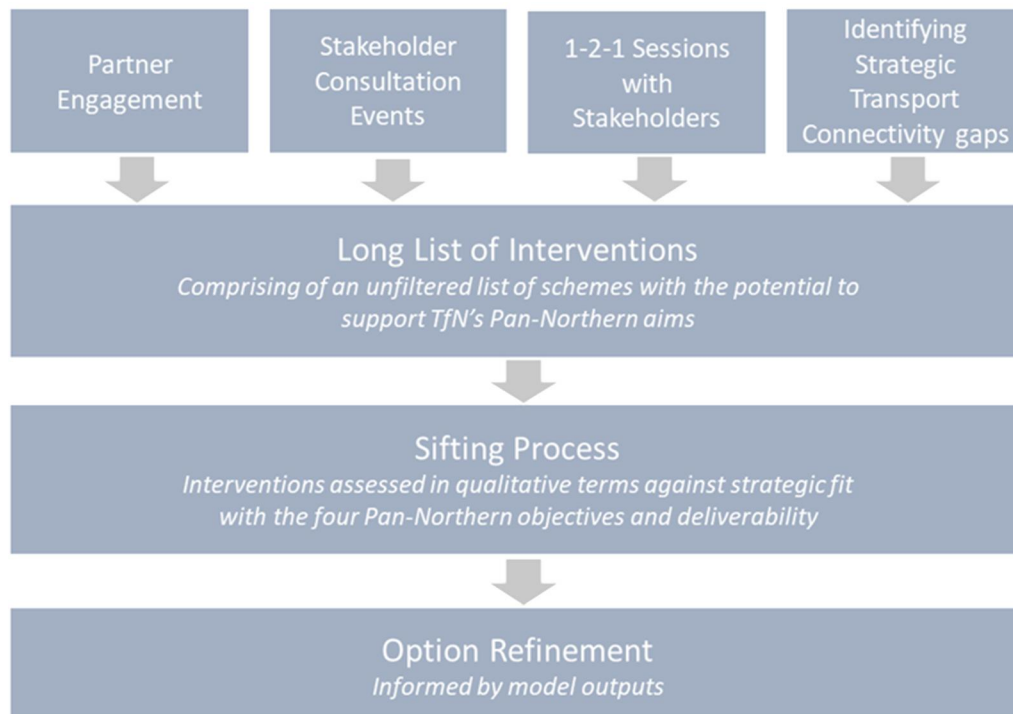
- Strategic Outline Business Case development and approval
- Outline Business Case (OBC) development and approval
- Full Business Case (FBC) development and approval

## 6 Option Assessment Process

### Overview

6.1 A staged approach has been taken to the identification of Pan-Northern transport schemes in the corridor as shown in Figure 29.

Figure 29 Staged approach to Pan-Northern transport scheme identification



## Option identification and shortlisting

- 6.2 For each SDC, a process of identifying and shortlisting schemes with Pan-Northern impacts was carried out. The initial long list of interventions was developed through engagement with stakeholders, complemented by reviewing policies and scheme proposals within the study corridors. Sources included: Highways England’s Road Investment Schemes, Network Rail’s Enhancements Delivery Plan, TfN STP, Long Term Rail Strategy, and local authority schemes. The longlisting exercise took account both of Pan-Northern outcomes, emerging policy and future technology developments.
- 6.3 Following creation of the longlist, a sifting process was undertaken considering each intervention’s strategic fit with the four STP objectives and SDC sub objectives (as set out in Table 5). This was based on a qualitative appraisal of each transport input’s likely contribution to the relevant performance measures and deliverability using a four-point scoring scale as set out in Table 6 and aided through application/ reference to a set of metrics (covering the four-point scale) for each performance indicator.

Table 6 Assessment scoring scale

Performance Measure	Deliverability	Rating
A strong fit with the desired outcome with large beneficial and/or Pan-Northern or national scale impacts	Strongly deliverable	
A good/reasonable fit with the desired outcome with beneficial and/or sub-corridor level impacts	Likely to be some deliverability issues but are not considered to be insurmountable	
A neutral/marginal impact with the desire outcome and/or with local impacts	Not applicable	
Conflicts with the desired outcome and/or conflict with other interventions, with risk amelioration/mitigation in place	Significant barriers to deliverability that need to be overcome through risk amelioration	

- 6.4 The sifting tool also provides a ‘performance rating’ for each of the four STP objectives. This does not represent a summation or weighting of the individual performance indicator ratings (‘scores’); but rather takes an informed risk-based view of how well/ poorly the potential intervention met the strategic objective when considered across the respective performance indicators.
- 6.5 In order to ensure a consistency of approach the sifting tool was subject to verification and moderation across all SDCs. The outcome of the initial

sifting exercise was to classify potential interventions into one of three categories:

- Core SOP Intervention: An intervention that has the potential to support transformation improvement, measured against the four Strategic Plan objectives, in its own right.
- Complementary SOP Intervention: An intervention that as part of a package of interventions that together have the potential to support transformational improvement (but is not Pan-Northern in its own right). Sequenced delivery could mean that complementary interventions come earlier, they could be the quicker wins.
- Non-Pan Northern Intervention: An intervention that would only have limited benefits as part of a package of interventions but may have local benefits.

6.6 All STP objectives have been treated with equal importance. Interventions that have the potential to strongly support one or more of the STP objectives may be considered a potential core intervention as part of a balanced SOP for the SDC as a whole. It is fully recognised that some potential interventions are likely to face barriers to deliverability and these challenges will need to be overcome as part of the scheme development process.

### Option refinement

6.7 Phase 1 of this study concluded with an Option Assessment Report (OAR) and an initial sifted list of interventions, representing a draft SOP. This draft SOP was appropriately coded into the regional highway and rail models for more detailed appraisal, refinement and package optimisation.

6.8 It was the intention to base the optioneering process on a transformational travel market, derived from the NTDM but as described previously this has not been possible owing to technical difficulties encountered during this stage of work.

6.9 Due to the reliance on a NTEM core demand scenario only it has been necessary to categorise SOP interventions for each SDC in the following manner:

- interventions that have a strong strategic case and are supported by the NTEM model outputs;
- interventions that have a strong strategic case but are not adequately represented by the NTEM Core travel market scenario and require further development and analysis.

6.10 The option refinement process also removed a number of potential interventions where the transport need was met by better performing alternative interventions or the intervention is not expected to make any meaningful contribution to the desired Pan-Northern transport outcomes.

## Key Pan-Northern Transport Outcomes and Programme of Interventions

- 6.11 A final Strategic Outline Programme (SOP) of interventions for the Central Pennines SDC has been defined and is presented below in Table 7 for both road and rail. The SOP proposals alongside the relevant Reference Case schemes are set against the key Pan-Northern outcomes within the corridor.
- 6.12 The SOP interventions within this report are accompanied with potential policy interventions regarding the function and purpose of inter-urban corridor. By embracing innovative solutions now, such as the policy interventions shown in Table 8, TfN can influence future infrastructure and improved connectivity. TfN will also ensure that, through engagement and dialogue with partners, investment plans for inter-urban routes are cognisant of and complement delivery of local strategies and policies for urban transport networks.
- 6.13 From a freight perspective work has been undertaken to better understand the implications of future growth in freight demand, both to, from and through the North of England, and the demand it might create at a spatial level for new warehousing associated with intermodal terminals and ports.
- 6.14 Table 9 lists the locations of potential warehousing that is assumed to be delivered in the North of England to assess the impact of clustered warehousing growth, with specific relevance to the Central Pennines geography.
- 6.15 Graphical representation of the SOP interventions are shown in Figure 30 for road and Figure 31 & Figure 32 for passenger rail at a Northern (combined SDC) and Central Pennines corridor level respectively.
- 6.16 The transport interventions shown are indicative at this stage. They are based on the level of evidence currently available at this very early stage of assessment. For many of the Reference Case schemes there remains a critical requirement to continue with the development of cases and to secure funding and TfN will work with partners to try and achieve that. It should also be pointed out that many of these interventions require further development and a positive funding decision before they can be delivered.
- 6.17 Delivery of these draft transport interventions should not be relied upon for planning and development purposes.

Table 7 Strategic Outline Programme of Interventions

Key Pan Northern Outcomes within the Central Pennines SDC	Status	Road	Rail/ Public Transport
Provision of high speed rail services across the North to the rest of the UK, radically reducing journey times and providing enhanced connectivity beyond the HS2 network & Ensuring the North is ready for HS2 to maximise the benefits of this nationally significant project	SDC Reference Case		<ul style="list-style-type: none"> <li>• Phase 2a</li> <li>• Phase 2b</li> <li>• Preston Station</li> <li>• Wigan North Western station</li> <li>• Lancaster station</li> </ul>
	SDC SOP intervention		<ul style="list-style-type: none"> <li>• Southport to Wigan (journey time improvements)</li> <li>• York to East Coast (journey time improvements)</li> <li>• Service frequency enhancements between Ormskirk and Preston</li> </ul>
Enhancing connectivity between the North's largest economic centres, with faster more frequent services, to build on HS2	SDC Reference Case		<ul style="list-style-type: none"> <li>• Northern Powerhouse Rail</li> <li>• Interventions at the major hubs necessary to realise the benefits of improved connectivity along the NPR corridors, including in the Central Pennines SDC: York, Manchester Piccadilly, Liverpool Lime Street, Bradford and the Leeds Station Masterplans</li> </ul>
	SDC SOP intervention		
Enhance North-South strategic connections across the North to support UK competitiveness	SDC Reference Case	<ul style="list-style-type: none"> <li>• Road Investment Strategy 1: north-south improvements on the M6</li> <li>• M1/M62 Lofthouse Interchange</li> </ul>	<ul style="list-style-type: none"> <li>• West Coast Main Line – Wigan and Preston to Scotland (journey time and capacity improvements)</li> </ul>
	SDC SOP intervention	<ul style="list-style-type: none"> <li>• M6 improvements Junctions 26 to 32</li> <li>• M6/M65 interchange</li> </ul>	

Key Pan Northern Outcomes within the Central Pennines SDC	Status	Road	Rail/ Public Transport
Enhance East-West strategic connections across the North to support UK competitiveness	SDC Reference Case	<ul style="list-style-type: none"> <li>• Road Investment Strategy 1: east-west improvements on the M62</li> <li>• A1(M) Junction 47</li> <li>• A1237 York Northern Outer Ring Road Phase 1</li> <li>• A1079/A164 Jock's Lodge junction</li> <li>• A64 Hopgrove Junction to Barton Hill</li> <li>• M60/M62/M66 Simister Island</li> <li>• M62 Junctions 26 to 27 including improvements to the M62/M606 Chain Bar junction</li> <li>• M1/M62 Lofthouse Interchange</li> <li>• Trans Pennine Tunnel and wider connectivity improvements</li> <li>• Manchester North West Quadrant SRN and multi-modal enhancements</li> </ul>	<ul style="list-style-type: none"> <li>• Transpennine Route Upgrade (including Intermediate Interventions)</li> </ul>
	SDC SOP intervention	<ul style="list-style-type: none"> <li>• M62 Junctions 5 to 10</li> <li>• M65 Junctions 2 to 6</li> <li>• M6 to A1(M) capacity and journey time improvements (potential options include M65 improvements, a new/upgraded route between the M65 and Skipton/A629/A650, A59 improvements, A671 improvements (M65 to A59), a new/upgraded route between Skipton/Harrogate and the A1, Shipley Eastern pinch point improvements and Leeds North West Quadrant improvements)</li> <li>• A59 Harrogate to York improvements</li> <li>• A1237 York Northern Outer Ring Road Phase 2</li> <li>• A64 Crambeck to Scarborough improvements</li> <li>• A1079 York to Hull improvements</li> <li>• M62 Junctions 30 to 33</li> </ul>	<ul style="list-style-type: none"> <li>• Skipton – Colne</li> <li>• Preston to York (journey time improvements)</li> <li>• York to Hull (service improvements)</li> <li>• Liverpool to Preston (journey time and service improvements)</li> </ul>

Key Pan Northern Outcomes within the Central Pennines SDC	Status	Road	Rail/ Public Transport
Enhance access to the North's international gateways in the Central Pennines SDC	Reference Case	<ul style="list-style-type: none"> <li>Leeds Bradford Airport Link Road</li> <li>A5036 Princess Way</li> <li>A63 Castle Street</li> <li>A63 Garrison Road roundabout</li> </ul>	
	SDC SOP intervention	<ul style="list-style-type: none"> <li>M57 Junctions 4 and 5 and Switch Island (M57/M58/A5036)</li> <li>Eastern route access package to Liverpool John Lennon Airport and associated developments</li> <li>Humber Ports access improvements incl. A63 relief route, A63/A1033 junction, A63 technology improvements</li> </ul>	<ul style="list-style-type: none"> <li>Leeds Bradford Airport Parkway station</li> <li>Rapid transit link between Liverpool South Parkway station and Liverpool John Lennon Airport</li> </ul>
Ensure that the needs of freight operators can be met	SDC Reference Case		
	SDC SOP intervention		<ul style="list-style-type: none"> <li>Selby to Port of Hull gauge enhancements and journey time improvements</li> <li>Port of Liverpool to West Coast Main Line enhancements</li> <li>Parkside enhanced connectivity</li> <li>West Coast Main Line freight capacity enhancements</li> <li>Port Salford rail freight access</li> <li>East-West W12 gauge cleared rail freight route</li> </ul>
Improve connectivity and resilience to tourism and economic clusters on the Fylde Coast economic cluster	SDC Reference Case	<ul style="list-style-type: none"> <li>A585 Windy Harbour – Skippool</li> <li>M55 J3 roundabout signalisation</li> <li>A585 Norcross junction improvement</li> </ul>	<ul style="list-style-type: none"> <li>Blackpool Tramway Extension</li> </ul>
	SDC SOP intervention	<ul style="list-style-type: none"> <li>A585(T) corridor improvements (M55 to Fleetwood)</li> <li>New Ribble road crossing</li> </ul>	<ul style="list-style-type: none"> <li>South Fylde Line (journey time and capacity improvements)</li> <li>Enhanced public transport links to Fleetwood</li> <li>Journey time improvements Preston - Blackpool North</li> </ul>

Key Pan Northern Outcomes within the Central Pennines SDC	Status	Road	Rail/ Public Transport
<p>Improve connectivity and resilience around the Humber, Liverpool City Region, Greater Manchester City Region, Lancashire, and Leeds City Region economic clusters in the Central Pennines SDC</p>	SDC Reference Case	<ul style="list-style-type: none"> <li>• Manchester North West Quadrant SRN and multi-modal enhancements</li> <li>• M65 Hyndburn-Pendle Growth Corridor junction improvements</li> <li>• M6/M58 &amp; A49 Link Roads</li> <li>• A650 Hard Ings Road</li> <li>• Bradford Shipley Corridor Improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Northern and Transpennine Express rail franchises</li> <li>• Liverpool Central Station</li> <li>• Manchester - Preston improvements</li> <li>• Liverpool City Region upgrades</li> <li>• Calder Valley Line upgrade</li> <li>• Cross Manchester Capacity and Reliability</li> </ul>
	SDC SOP intervention	<ul style="list-style-type: none"> <li>• A164 dualling (A63 to B1232)</li> <li>• A580 dual carriageway with some grade separated junctions</li> <li>• M57 smart motorway</li> <li>• Highway interventions to unlock employment and housing growth potential and improve strategic and local connectivity across the north and west of Greater Manchester (including: Wigan to Bolton strategic route, Northern Gateway access and capacity enhancements (rapid transit enhancements, M60 Junction 19 park and ride, M66 Junction 3 to M62 Junction 19 link road, and new M62 Junction 18a))</li> <li>• M66 smart motorway and junction improvements</li> <li>• Highway interventions to support Atlantic Gateway employment and housing growth, reduce the severance impact of the Manchester Ship Canal and improve connectivity to the Strategic Road Network (including: M62-Carrington-M60 link and M62 to A57 Junction and link)</li> <li>• A59 corridor improvements (Liverpool to Preston)</li> <li>• M58/M6 interchange</li> <li>• A5058/A671 improvements (M65 to A59)</li> <li>• A56 corridor improvements (M65 to M66)</li> <li>• M6 Junction 25 slip roads</li> <li>• Highway improvements within Bradford District (including South East Bradford Access Route, Shipley Eastern pinch point improvements and improved or new roads connecting the A650 and Keighley)</li> <li>• Highway improvements within Calderdale and Kirklees (including M62 Junction 24a and North Kirklees Orbital Route)</li> </ul>	<ul style="list-style-type: none"> <li>• Hull to Scarborough (journey time and frequency improvements)</li> <li>• Burnley to Manchester (journey time and service improvements)</li> <li>• Rossendale to Manchester public transport connectivity</li> <li>• East Lancashire Line (journey time and capacity improvements)</li> <li>• Colne to Accrington (journey time and service improvements)</li> <li>• Bradford to Leeds (journey time improvements)</li> <li>• Harrogate Line (journey time improvements)</li> <li>• Continued programme of work to develop the capacity and capability of the rail network in the Leeds City Region</li> </ul>



Key Pan Northern Outcomes within the Central Pennines SDC	Status	Road	Rail/ Public Transport
Facilitating significant private sector investment to support economic growth and UK competitiveness	SDC Reference Case	<ul style="list-style-type: none"> <li>Improved links between Western Gateway Canal Crossing, Port Salford and M60 between Junctions 10 and 11 and improvements to the M60 between Junctions 9 and 10 and 11 and 12</li> </ul>	
	SDC SOP intervention		
Facilitating the delivery of housing growth	Reference Case	<ul style="list-style-type: none"> <li>A582 Preston Western Distributor</li> <li>A582 South Ribble Western Distributor</li> <li>M62 Junction 6</li> <li>M6 Junction 33 Link Roads</li> </ul>	
	SDC SOP intervention		<ul style="list-style-type: none"> <li>Skelmersdale Rail Link</li> <li>Cottam Parkway</li> <li>East Leeds Parkway</li> </ul>

Table 8 Potential policy interventions

Potential Policy Intervention
Enhance digital connectivity across the rail network
Expand digital signalling on the rail network
Increase efficiency of the road network through use of technology e.g. Connected & Autonomous vehicles
Use of data / technology to improve management of freight demand on the rail network
Improved integration across travel modes e.g. through smartcard / mobile technologies
Improved customer experience
Low emission & clean air zones
New pricing models for road and public transport

Table 9 Warehousing growth by region (assumptions made for freight modelling of clustered warehousing)

Location <sup>58</sup>	Local Authority	Region
Northern Gateway	Rochdale	North West
Skelton Jn	Trafford	North West
Trafford Park	Trafford	North West
Carrington	Trafford	North West
Parkside	St. Helens	North West

<sup>58</sup> The warehouse locations shown are indicative at this stage. These draft transport interventions should not be relied upon for planning or development purposes.

Location <sup>58</sup>	Local Authority	Region
Port Salford	Salford	North West
Knowsley Industrial Park	Knowsley	North West
Garston	Liverpool	North West
Port of Liverpool	Sefton	North West
3MG	Halton	North West
Runcorn Docks / Port of Weston	Halton	North West
Port of Warrington	Warrington	North West
Selby	Selby	Yorkshire & the Humber
Stourton	Leeds	Yorkshire & the Humber
Normanton	Wakefield	Yorkshire & the Humber
Hull Saltend	East Riding of Yorkshire	Yorkshire & the Humber
Hull Dock	East Riding of Yorkshire	Yorkshire & the Humber
Goole	East Riding of Yorkshire	Yorkshire & the Humber
Immingham Dock	North East Lincolnshire	Yorkshire & the Humber

Figure 30 Central Pennines SDC Road Reference Case and SOP Proposals

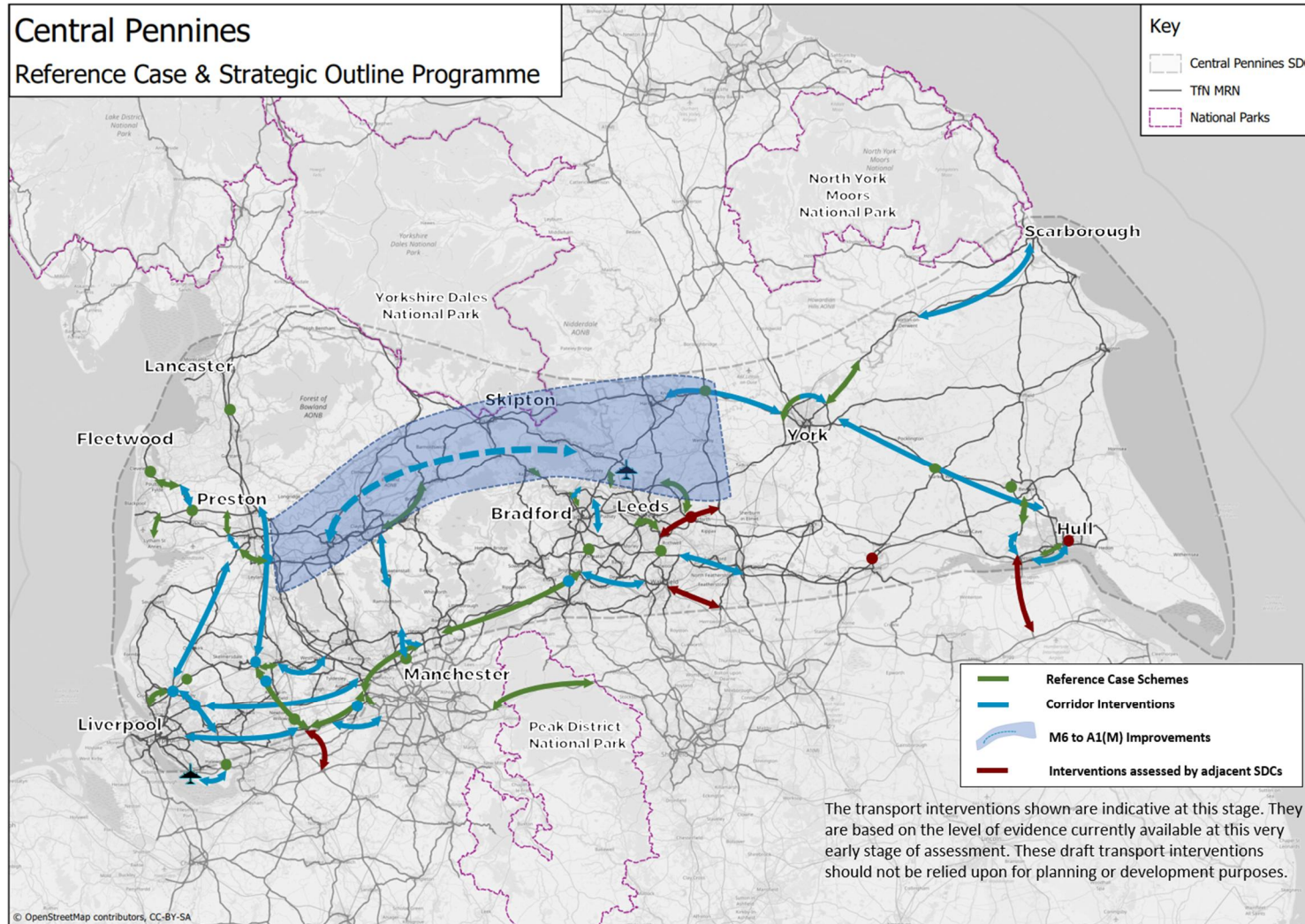


Figure 31 Passenger rail SOP proposals across the Strategic Development Corridors

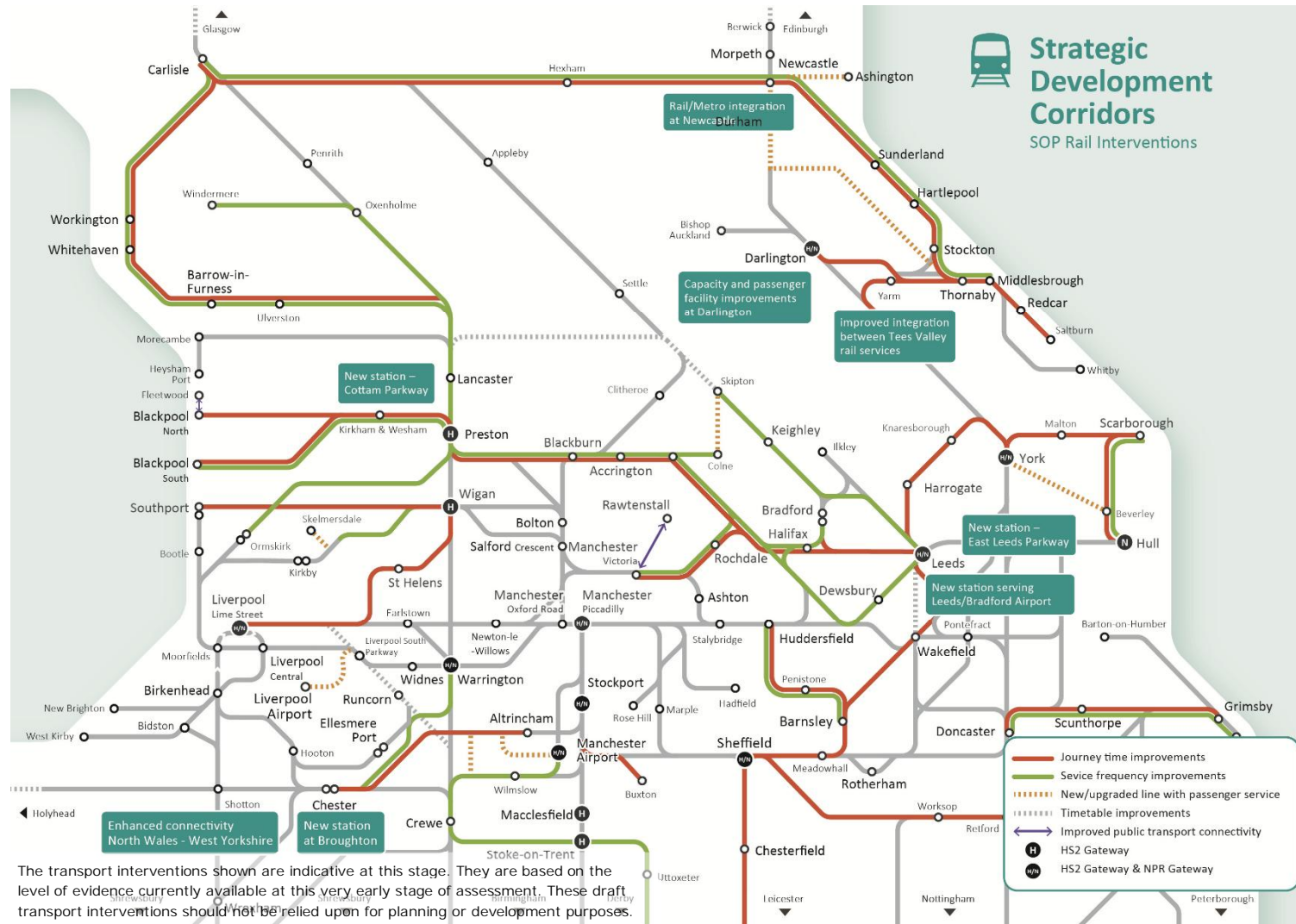
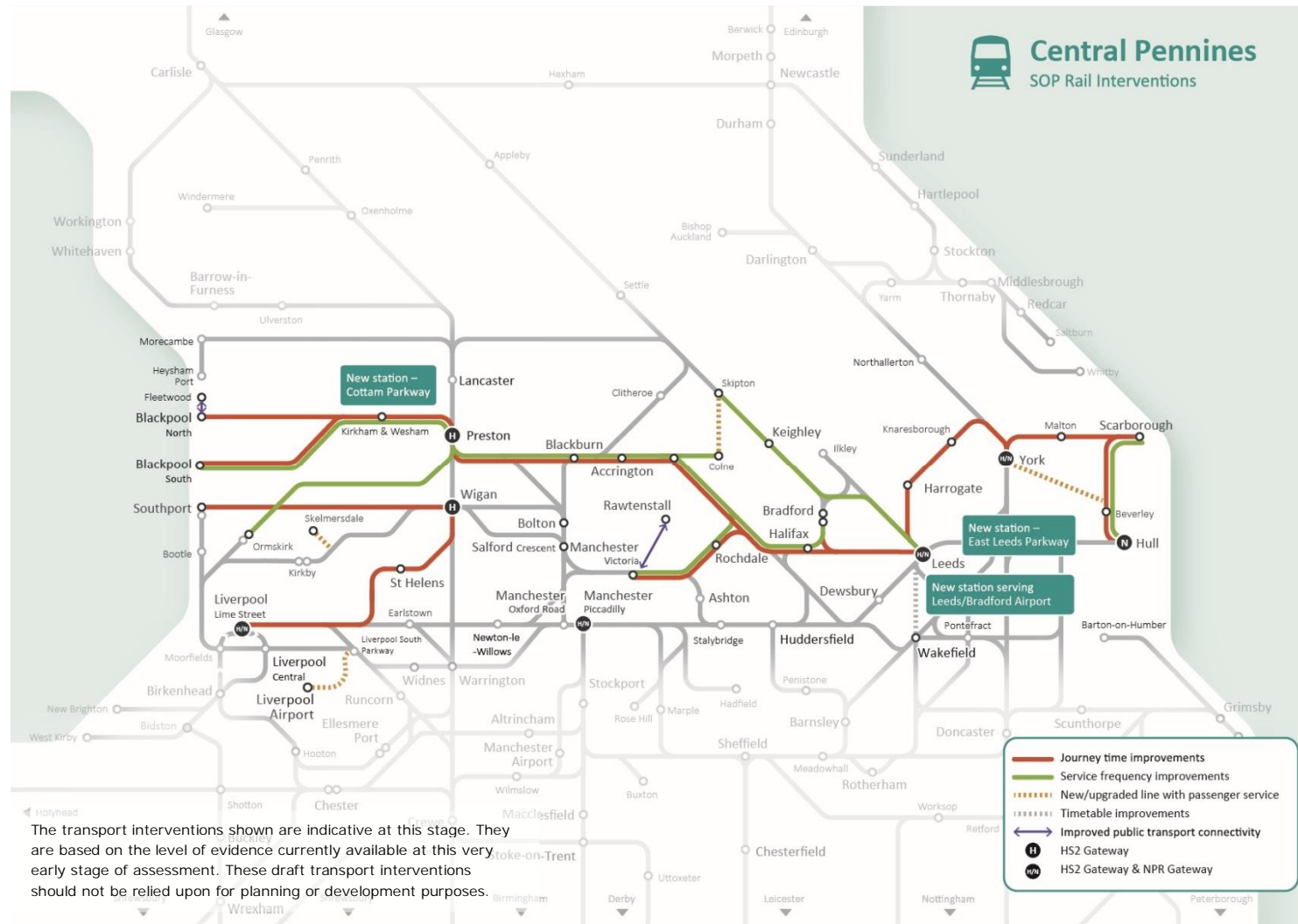


Figure 32 Central Pennines SDC passenger rail SOP proposals



## Stakeholder Consultation

- 6.18 Given the wide-ranging impacts of the proposed schemes in this study, a wide range of stakeholders, with an interest in the study, were engaged with.
- 6.19 TfN undertook three Stakeholder Consultation sessions for the Central Pennines SDC to inform the optioneering process and encompassing representatives from Councils, transport authorities and businesses with an interest in the SDC area. These sessions were:
- Hull on 21st November 2017 at the Britannia Royal Station Hotel
  - Preston on 23rd November 2017 at the Cotton Court Business Centre
  - Leeds on 24th November 2017 at the Leeds Marriott Hotel
- 6.20 Follow-up briefing events were undertaken in February and March 2018.
- 6.21 During these consultations the following key views were raised by stakeholders:
- East-west connectivity on road & rail is a big issue for businesses, hampered by restricted capacity and congestion.
  - We need to invest in increasing capacity through new infrastructure but also getting more from our existing assets.
  - In relation to a lot of the current problems identified, reliability and capacity are more important than speed.
  - More freight needs to be enabled to use the rail network & also waterways
  - Clear leadership and momentum from within the region are crucial to driving progress where previously it has been slow – that means consensus behind key priorities and a more unified voice
  - A more holistic and proactive response to infrastructure planning would enable us to get upstream of major developments, unlocking growth opportunities more quickly
- 6.22 The following four key issues, based on these stakeholder views, influenced the optioneering process as follows:

Issue raised	Influence on Optioneering
Journey times, reliability and capacity are all problems that compound challenges to travel across the region, not just on major routes or in / out of the big cities	Reducing journey times, increasing reliability and increasing capacity are potential outcome areas in all sub-corridors. Examples include improvements to M6/Preston to East Lancs. and East Lancs. to Leeds/Bradford and the A1(M); improved rail journey times Bradford to Hull, increased rail service frequency East Lancs. to Manchester.
East-west connectivity is a big issue for businesses,	We are looking at how to increase provision for Northern Ports and Trans-Pennine freight traffic through work on key east-west road and rail

with implications for freight and the ports	routes. Examples include improved road access to Ports of Liverpool & Hull, improved road & rail access to Leeds/Bradford Airport.
We need to make more effective, efficient use of existing assets, as well as new infrastructure	We are looking at better use of technology to increase the efficiency of the road and rail system, which could include digital signalling expansion on rail and enabling autonomous vehicles on the SRN. This includes enabling infrastructure for electric and autonomous vehicles, improving the flow of data between transport managers / operators and the introduction of Smart ticketing which TfN is taking forward.
We need to enable more freight to get onto the rail network	Options for rail freight include both new capacity, particularly East-West, and better use of data/ technology to manage freight demand and integration of rail paths, sharing data between operators and requirements for freight to be fully considered during timetable recasts for passenger services.

## 7 Strategic Dimension Summary

- 7.1 This document sets out the case for the strategic importance and necessity of the proposed programme of interventions in the Central Pennines SDC. It is necessary to be ambitious to meet the vision and objectives of the DfT and TfN and those of partners across the North to support the region's, as well as the country's, future prosperity by investing in a modern and reliable transport network that will help to rebalance the UK economy, improve overall regional productivity and enable inclusive growth.
- 7.2 The Strategic Dimension has clearly outlined the strategic needs of the Corridor and how the proposed programme of interventions will add significantly more value than by the reference case alone. It was shown that only by moving forward with these additional investments and projects, transformational growth can be achieved which will benefit not only the Central Pennines corridor but also the wider competitiveness of the UK.
- 7.3 This document has also demonstrated the close alignment of the proposed programme of interventions with national, regional and local policies. In a next step, the Strategic Dimension has also discussed in detail the transport challenges and economic opportunities of the Central Pennines corridor. The following opportunities with respect to the proposed programme of interventions have been identified with particularly high potential to achieve transformational growth in the region and the North:
- Improving business to business connectivity;



- Supporting access to employment;
- Improving international connectivity and strengthening the visitor economy; and
- Supporting the Built/Natural Environment.

7.4 In a following step, the Option Assessment Process was described in detail to allow a transparent review of how the numerous interventions were scored and identified as priority actions. Additionally, the wider context outlining the programme's delivery constraints, interdependencies with other implemented or planned projects as well as wider stakeholder needs, and views were provided to reflect the bigger picture with regards to the ease of implementation, its relation to other projects and the wider public opinion.

7.5 In addition to the strategic assessment of the proposed programme of interventions, more detailed information on economic, financial, commercial and management implications are required to demonstrate an informed and comprehensive case. The next section outlines the Economic Dimension demonstrating the value for money (VfM) of the proposed programme of interventions.

## Economic Dimension

The focus of the Economic Dimension is demonstrating that the proposed package represents Value for Money to the UK as a whole, in that:

- It is a justified public sector intervention, with positive impacts outweighing costs and negative impacts
- A process of refinement has been undertaken, working towards a programme which represents the strongest option

## 8 Introduction

### Background

- 8.1 The Economic Dimension sets out the approach taken to quantifying benefits and costs as part of the assessment, and also provides qualitative assessments of impacts which cannot be quantified at this stage of assessment.
- 8.2 The evidence-led process which led to the identification of a programme of interventions for the Central Pennines Strategic Development Corridor (SDC) is described in Chapter 5, within the Strategic Dimension of this Strategic Programme Outline Case (SPOC). The programme combines road and rail interventions of differing scales and delivery programmes, with beneficial outcomes to individuals and organisations within and beyond the SDC area.
- 8.3 The economic case concludes with a Value for Money (VfM) assessment which draws together the quantified and qualitative factors, the latter including consideration of the programme's alignment with Department for Transport (DfT) and Transport for the North (TfN) strategic objectives as set out in Table 1 and Table 5 respectively. These matters will be combined with a consideration of strengths and limitations in the level of analysis at SPOC stage, to determine a VfM category for the programme.
- 8.4 The economic appraisal has followed the TfN assurance process which includes:
- Technical Assurance Group (TAG) Meetings - to agree the appraisal process with partners;
  - Weekly Senior Modelling Group (SMG) meeting across the delivery teams to ensure that a consistent approach is applied to the different SDCs and the different modes; and
  - Technical Assurance 'deep dive' sessions to ensure that the appraisal outputs are robustly checked.
- 8.5 The level of appraisal and assurance undertaken is considered to be greater than what would normally be expected at Strategic Outline Programme (SOP).

8.6 The appraisal is documented in detail in the following supporting documents:

- Combined Transport Forecasting and Economics Report
- Environmental Appraisal Report (EAR)
- Appraisal Summary Tables (AST)

### Rationale for Investment

8.7 The appraisal will demonstrate that further investment is required above the reference case in order to achieve transformational growth. The current case is built upon National Trip End Model (NTEM) Core growth only. Transformational growth would generate a larger demand and greater benefits. However, transformational growth scenarios have not been assessed at this stage.

### Approach to Value for Money Appraisal

8.8 The VfM appraisal of the Central Pennines SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance<sup>59</sup> (WebTAG) as current at May 2018. Unless stated otherwise monetised impacts within the Economic Dimension are presented in 2010 Gross Domestic Product (GDP) Deflator Real Market Prices discounted to 2010 present values<sup>60</sup>, as specified by WebTAG.

8.9 The proportionate approach to the VfM appraisal of the Central Pennines SDC Programme was set out in the Stage 1 Appraisal Specification Report<sup>61</sup> (ASR) for the study. The ASR set out how the economic, environmental and operational assessments for the project would be undertaken, and how they would be supported by traffic modelling, whilst taking into consideration budgetary, programme, political, environmental and spatial constraints. It is noted that the approach evolved over the course of the study (as is to be expected); nonetheless the ASR remains a useful reference document in support of this SPOC.

8.10 The Economic Dimension for each of the Central Pennines; Energy Coasts; Southern Pennines; and West and Wales corridors, sets out the approach taken to forecasting the demand and economic impacts resulting from the programme of highway interventions within a modelling framework which represents the specific corridor. Passenger rail interventions, which in many cases have impacts which are not contained within the corridor boundaries, have been represented in a separate exercise for all four corridors combined. Similarly, the highway and rail freight impacts, which are UK-wide, have been separately represented. Changes in travel times and costs resulting from these wider interventions, have been included within the

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<sup>59</sup> <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

<sup>60</sup> For further details, see paragraph 10.11 onwards

<sup>61</sup> Product 04: Appraisal Specification Report (February 2018)

Reference Case for the highway intervention forecasts, to limit the potential double counting of their impacts. Results from the separate analyses are brought together within the VfM statement.

- 8.11 The demand and economic benefits forecasting for the programmes of interventions is based on ‘business as usual’ travel market growth in line with DfT’s NTEM<sup>62</sup>. In contrast, the option identification and selection process was based on the assumption that the transformational economic growth identified in the Northern Powerhouse Independent Economic Review (NPIER) was achieved. On balance, TfN considers the constructed case to be more credible with lower demand growth and less uncertainty, than the alternative with transformational growth at this stage of development. TfN will assess transformational impacts in any further business case development using its Analytical Framework.
- 8.12 Accordingly, the forecast demand and economic benefits presented in this Economic Dimension considers only at this stage those interventions that have both a strong strategic case and are supported by the NTEM Core model outputs<sup>63</sup>.
- 8.13 Table 10 below lists the final Strategic Outline Programme (SOP) of road interventions that have been appraised at this very early stage of programme development for the Central Pennines SDC, alongside those interventions that have a strong strategic case but are not adequately represented by the NTEM Core travel market scenario and require further development and analysis at the next stage of work which will include transformational growth scenarios.

Table 10 Appraisal of Strategic Outline Programme of Road Interventions

Road Interventions Appraised within the Economic Dimension
<ul style="list-style-type: none"> <li>· M6 improvements Junctions 26 to 32</li> <li>· M6/M65 Interchange</li> <li>· M62 Junctions 5 to 10</li> <li>· M65 Junctions 2 to 6</li> <li>· M6 to A1(M) capacity and journey time improvements</li> <li>· A59 Harrogate to York improvements</li> <li>· A1237 York Northern Outer Ring Road Phase 2</li> <li>· A64 Crambeck to Scarborough improvements</li> <li>· A1079 York to Hull improvements</li> <li>· M62 Junctions 30 to 33</li> <li>· A63 Relief Route</li> <li>· A585(T) corridor improvements (M55 to Fleetwood)</li> </ul>

<sup>62</sup> For the programmes of highway interventions, NTEM modal growth assumptions are adjusted for network conditions within the variable demand modelling approach applied. For rail intervention, equivalent adjustments are made to forecast rail mode share by application of the rail industry’s Exogenous Demand Growth Estimation (EDGE) process.

<sup>63</sup> TfN is developing the transport modelling tools plan to take forward further analysis and appraisal of the Strategic Outline Programme of transport interventions, including economic appraisal of schemes not adequately represented by the NTEM Core travel market scenario.

- New Ribble road crossing
- A164 dualling (A63 to B1232)
- A580 dual carriageway with some grade separated junctions
- M57 smart motorway & Junction 4 and 5 improvements
- Wigan to Bolton strategic route
- M66 smart motorway and junction improvements
- M62-Carrington-M60 link
- M62 to A57 Junction and link
- A59 corridor improvements (Liverpool to Preston)
- M58/M6 interchange
- A56 corridor improvements (M65 to M66)
- South East Bradford Access Route
- M62 Junction 24a
- North Kirklees Orbital Route

#### Road Interventions Not Appraised within the Economic Dimension at this stage <sup>1</sup>

- Switch Island (M57/M58/A5036)
- Eastern route access package to Liverpool John Lennon Airport
- A63 technology improvements
- Northern Gateway access and capacity enhancements
- M6 Junction 25 slip roads

Table 11 Appraisal of Strategic Outline Programme of Rail Interventions

#### Rail Interventions Appraised within the Economic Dimension

- Journey time improvements Preston to Blackpool North
- Skelmersdale rail link
- East Lancashire Line (journey time and capacity improvements)
- Burnley to Manchester journey time and service improvements
- Preston to York (journey time improvements)
- Crewe – Stoke - Derby (journey time improvements)
- Extension of North Staffordshire services to Nottingham and Manchester Airport
- Manchester – Skelmersdale (via Wigan) service frequency enhancement
- New stations at Droylsden/Littlemoss (Eastern Gateway) and Stoke park and ride
- Buxton Line (journey time improvements)

#### Rail Interventions Not Appraised within the Economic Dimension at this stage <sup>1</sup>

- South Fylde Line (journey time and capacity improvements)
- Service frequency enhancements between Ormskirk and Preston
- Liverpool to Preston (journey time and service improvements)
- Southport to Wigan (journey time improvements)
- Colne to Accrington (journey time and service improvements)
- York to East Coast journey time improvement
- Skipton – Colne reopening
- Bradford to Leeds (journey time improvements)
- Harrogate Line (journey time improvements)
- Blackburn to Manchester Victoria (journey time improvements)
- Rossendale to Manchester public transport connectivity
- New stations at Leeds Bradford Airport Parkway, East Leeds Parkway and Cottam Parkway
- Rapid transit link between Liverpool South Parkway station and Liverpool John Lennon Airport
- York to Hull (service improvements)
- Hull to Scarborough (journey time and frequency improvements)
- Cumbrian Coast Line – journey time and capacity improvements
- Whitehaven to Newcastle (frequency improvements)
- Furness Line – Journey time and reliability improvements
- Windermere to West Yorkshire (service improvements)
- Tyne Valley Line – route upgrade and service improvements

- Durham Coast Line – route upgrade and service improvements
- Middlesbrough to York journey time and service improvements
- Bishop Auckland to Saltburn Line journey time improvements
- Increased service calls at Hartford and other WCML stations
- Mid-Cheshire Line (journey time and capacity improvements)
- Northwich to Sandbach reopening and new stations
- Knutsford to Manchester Airport (Western Link connection)
- Extension of Leeds – Chester service to Llandudno Junction
- New station at Broughton
- Direct connectivity between Preston/Bolton and Sheffield
- Rail connection and station for Doncaster Sheffield Airport
- New station between Barnetby and Habrough
- South Trans-Pennine Line – journey time and capacity improvements between Doncaster and Cleethorpes
- Sheffield to Lincoln (journey time improvements and service frequency enhancements)
- Penistone Line (journey time improvements and service frequency enhancements)
- Hallam Line (journey time improvements)
- Barnsley – Doncaster direct services
- Sheffield – Nottingham (journey time improvements)

## Distributional Impacts

- 8.14 Distributional impacts (DI) consider the variance of transport intervention impacts across different social groups. DfT guidance on Distributional Impact Appraisal<sup>64</sup> identifies the eight indicators where DI may apply, beneficially or adversely: user benefits, noise, air quality, accidents, security, severance, accessibility and personal affordability. Step 1 in a DI appraisal is a screening process, identifying whether any impacts which remain after mitigation actions are either significant or concentrated and therefore whether progressing DI appraisal through subsequent steps in the process is necessary.
- 8.15 A completed DI Screening Pro-Forma has been completed and included within the Forecasting and Economic Appraisal Report. At the programme level, the following impacts are identified through the screening process as having the potential for significant or concentrated consumer (non-business) impacts during the operational phase<sup>65</sup>:
- User benefits: changes in consumer (non-business) journey times, including from improved reliability and punctuality. This impact area has the closest match with the rationale underlying the SDC programme, with the expected outcomes being in terms of journey time savings which effectively improve connectivity between residents and

<sup>64</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/638644/TAG\\_unit\\_a4.2\\_distrib\\_imp\\_app\\_dec2015.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/638644/TAG_unit_a4.2_distrib_imp_app_dec2015.pdf)  
(December 2015)

<sup>65</sup> DfT DI Guidance excludes employers' business trips and impacts during construction

opportunities and improve accessibility by offering greater choice of in-scope destinations

- Personal Affordability: changes in consumer (non-business) journey costs considering highway impacts (vehicle operating costs)

- 8.16 The potential for the above two indicators to have a material DI impact has been appraised within this SPOC, and can be found in chapter 13 described under the relevant social impacts indicators. Both areas are fundamental to the strategic objectives which underpin the SDC programme in support of TfN's STP (see Table 5), together representing the improvement in connectivity from a more efficient transport system and resulting gain in productivity.
- 8.17 The screening process should not be interpreted as a suggestion that TfN does not consider the remaining DI impacts as unimportant nor unaffected. As business cases for interventions within the SDC individually or in packages come forward, the DI screening process will be repeated. At a more local scale it is likely that the screening process will identify a different group of indicators to take to DI appraisal.
- 8.18 It is further noted that the three impacts identified for consideration above, are simply where material impacts of the programme overlap with indicators which DfT has identified for their DI potential. Elsewhere in the Economic Dimension, the material impacts of the programme are considered – with particular attention given where these align with the underpinning strategic rationale.

## Structure of Economic Dimension

- 8.19 The remainder of the Economic dimension of this SPOC is structured as follows:
- Chapter 9 describes the approach to costing interventions, including the treatment of optimism bias, and summarises the overall cost of the programme
  - Chapter 10 outlines the approach to quantifying the impacts of the programme, including the forecasting of demand impacts and the processes of economic appraisal
  - Chapters 11 to 14 follow the format of DfT's Appraisal Summary Table introducing the SDC Programme's: Economy impacts (11); Environment impacts (12); Social impacts (13); and Public Accounts impacts (14)
  - Chapter 0 brings the various impacts together, with a consideration of the robustness of the analyses completed, as a Value for Money statement for the programme

## 9 Approach to Cost Estimation

### Introduction

- 9.1 This chapter sets out the derivation of the implementation costs of delivering the Central Pennines SDC programme and the lifecycle costs, comprising maintenance, operating costs (for rail only) and renewals costs for the interventions delivered.
- 9.2 The monetised Economic Appraisal, which forms the foundation of the VfM Appraisal, represents the difference between a Reference Case<sup>66</sup> and the interventions of the SDC programme.
- 9.3 Subsequent text describes the approaches to cost risk and uncertainty, including the treatment of Optimism Bias. This chapter concludes by presenting the net costs which are compared against monetised benefits within the Economic Appraisal.

### Approach to Intervention Sequencing

- 9.4 For reasons of practicality the approach to quantifying the impacts of the Central Pennines SDC programme adopts the proportionate approach of assuming a single opening year for all interventions. For internal consistency, within the Economic dimension the same approach has been taken with implementation costs, represented up to a 2035 assumed opening year and lifecycle costs from then onwards (over a 60 year appraisal period (2035 – 2094)).
- 9.5 It is noted that this approach does not have any material effect on the results of the economic appraisal or the robustness of any conclusions based on that appraisal. In terms of implementation costs, this approach effectively assumes that the discounted cost would not change if it was assumed to be incurred in a different year, that is that the downward effect of discounting and the upward effect of real terms inflation and increasing uncertainty would tend to cancel out.

### SDC Programme

#### Implementation Costs

- 9.6 The Central Pennines economic appraisal considers the capital cost of the SOP itself, together with any changes in the capital cost of operation and maintenance in future years. Only those schemes presented in Table 10 are considered within this economic appraisal.
- 9.7 It should be noted that the costs used in economic appraisal differ from the outturn costs used for funding decisions and to those presented within the Financial Case. For the economic appraisal of the Central Pennines SDC, all monetary units are presented in 2010 discounted market prices.

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<sup>66</sup> For further details, see paragraph 2.24 onwards



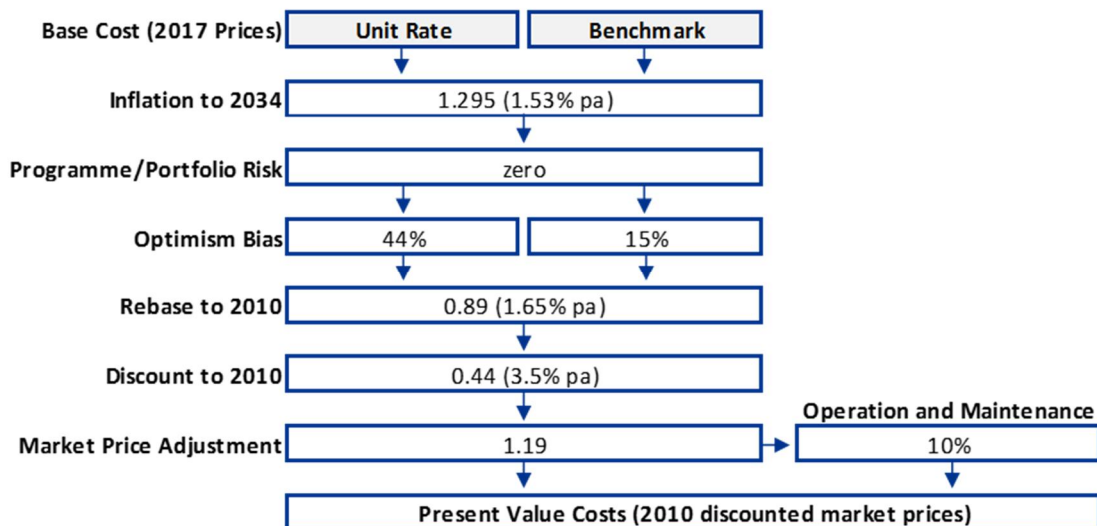
9.8 As part of the SDC programme, two sources of deriving representative base scheme costs have been used:

- Unit Rates – a series of rates per km or per intervention type provided by Benchmark which drew upon their industry knowledge and database which contained scheme cost information which was not publicly available. These unit rates include all construction costs, design and preparation, lands costs, enabling works, supervision, statutory undertakers and third party infrastructure costs before risk and inflation.
- Benchmark – Some schemes within the Central Pennines SDC SOP were not considered suitable to be costed via the unit rate methodology due to their complexity (e.g. schemes with complex structures, bridges or known engineering challenges) or anticipated high value. Benchmark prepared base costs for these interventions based upon the Highways England Major Projects standard cost estimate structure and Association for the Advancement of Cost and Engineering International (AACEI) Class 5 given the early concept stage which the SDC SOP is currently at.

9.9 It should be noted that the process described in this section refers to Highway capital costs. The approach to developing passenger rail costs is set out in the Passenger Rail SPOC.

9.10 These two sources of costs provide values scheme base costs in 2017 prices. The process to convert of 2017 scheme base costs to 2010 discounted market prices to be used in appraisal is presented within Figure 33. Further details are provided below and in the Economic Assessment Report.

Figure 33 Estimation of Costs for Appraisal



9.11 Table 21 in Chapter 14 presents the Central Pennines SOP scheme costs in the format of the DfT's CPSS Cost Proforma Summary Sheet. This shows the build-up of the scheme costs from 2017 Base Costs through to 2010 discounted market prices representing the SOP investment costs. Section 14 also presents the Present Value Costs of the Central Pennines SOP.

- 9.12 Although a cost allowance has been made for Operation and Maintenance, at this early stage of appraisal the expected benefits generated by net savings from construction and future year maintenance have not been captured.

#### Lifecycle Costs

- 9.13 Given the early stage of scheme development, a full assessment of expected operating and maintenance costs has not been undertaken. For the purposes of the economic appraisal, operation and maintenance costs equivalent to 10% of the Present Value (PV) of total capital costs has been included.
- 9.14 These costs have been assumed to all be incurred within the single year of 2035.

#### Cost Risk and Uncertainty

- 9.15 Given the early stage of cost development, no risk or contingency has been included.
- 9.16 The 44% Optimism Bias applied to schemes costed through the unit rate methodology is in line with WebTAG guidance for Road schemes at Stage 1 of scheme development.
- 9.17 For Benchmark costed schemes, a lower level of 15% Optimism Bias has been applied. This is a reflection of the robust evidence based and costing methodology available to Benchmark as a result of their intellectual property, industry experience and application of risk within the 2017 base costs. The risk allowances Benchmark applied were based on typical levels for estimates within the Major Projects portfolio and are consistent with Highways England submissions. As set out in WebTAG A1.2 paragraph 3.5.10 *"in cases where the risk assessment can draw on an extensive reference class database of similar schemes; accounts for unquantifiable risks through a top-down uncertainty adjustment; and is complemented by governance arrangements, such as verification of cost estimates by independent experts, robust and comprehensive cost estimation can potentially reduce the optimism bias adjustment. The Highways England's Project Control Framework is an example where this has been effectively applied."*
- 9.18 The SDC programme cost estimate is based upon the assumption that the full package of measures associated with the programme will be delivered by 2035. At this stage of scheme development, it has been assumed that all costs will be incurred in the single year of 2034.

## 10 Quantified SDC Programme Impacts

### Introduction

- 10.1 This chapter summarises the quantification of the impacts of the Central Pennines SDC programme including the approach to and results of the demand forecasting undertaken and of the monetised Economic Appraisal. It describes how the transport models used to represent the impacts of the Reference Case and SDC Programme fit within TfN's wider analytical framework.

### Approach to Demand Forecasting

- 10.2 This section sets out the approach to:

- Highway demand modelling;
- Passenger rail demand modelling; and
- Freight and logistics modelling.

#### Highway Demand Modelling

- 10.3 Highway forecasting was undertaken using a modified version of the Highways England 2015 Trans-Pennine South (TPS) Regional Transport Model (RTM). The model zoning was reviewed and disaggregated where appropriate in areas where SOP interventions are likely to be located.
- 10.4 Future year forecasts have been developed for 2035 and 2050 using DfT standard forecasts. The full forecasting process is described in detail in the Combined Traffic Forecasting and Economic Appraisal Report.
- 10.5 Generalised Costs for Value of Time (VoT) and Vehicle Operating Costs have been included from TAG Databook December 2017.

#### Passenger Rail Demand Modelling

- 10.6 Rail passenger forecasting was undertaken using the NoRMS Phase 2 model, which was developed by TfN and is a Cube-based rail assignment model of the North of England, including all rail stations. The model includes a simplified representation of the network outside of the North, providing access to external destinations, and is combined with an endogenous impact model to provide elasticity-based changes in demand based on changes in service provision. Further details are available within the Rail SPOC.

#### Freight and Logistics Modelling

- 10.7 The Freight and Logistics Market is modelled using the Great Britain Freight Model managed and owned by MDS Transmodal (MDST). The inputs to the model come from standard DfT statistics for Ports and Maritime, road data collected through the Continuing Survey of Roads Goods Transport (CSRGT) and private sector intelligence. MDST also utilise Network Rail data which although highly sensitive, is presented in such a way so individual rail flows cannot be identified. The Heavy Goods Vehicle and Van data that is used to

model the road freight impacts can be aggregated in terms of benefits. The other freight scenarios that have been used include looking at the impact of larger ships, warehouse clustering and rail capacity that is both constrained and unconstrained. These scenarios cannot be aggregated together as they rely on very different economic conditions and private sector investment to grow.

## Forecast Impact of the SDC Programme

- 10.8 The forecast impact on traffic flows of the SDC programme, at this very early stage of development work is shown in Figure 34. The difference plot shows an increase in flows between Preston and York and demonstrates that the programme improves connectivity between Lancashire and Yorkshire. The programme helps to relieve pressure on existing Trans-Pennine routes such as the M62.
- 10.9 Figure 35 provides a spatial summary of the economic benefits. This shows that benefits are generated across the corridor. The largest benefits are generated in Manchester, Leeds and Bradford. Minor dis-benefits are generated in Scarborough and to the north of York (Hambleton). This is due to the increase in demand caused by interventions outside of those areas:
- For Scarborough, improvements to the A64 to the west of Malton result in an increase in flows on roads into Scarborough. The increase in flow results in a marginal increase in travel time resulting in a small overall dis-benefit.
  - For Hambleton, improvements along the A59 corridor outside of Hambleton cause an increase in flow along the A1(M) through Hambleton. The increase in flow results in a marginal increase in travel time resulting in a small overall dis-benefit.
- 10.10 It is expected that further refinement of the interventions during the next stage of work and local improvements would help to mitigate any dis-benefit.

Figure 34: 2050 Daily (AADT) Flow Difference (Do Something Strategic Outline Programme minus Reference Case)

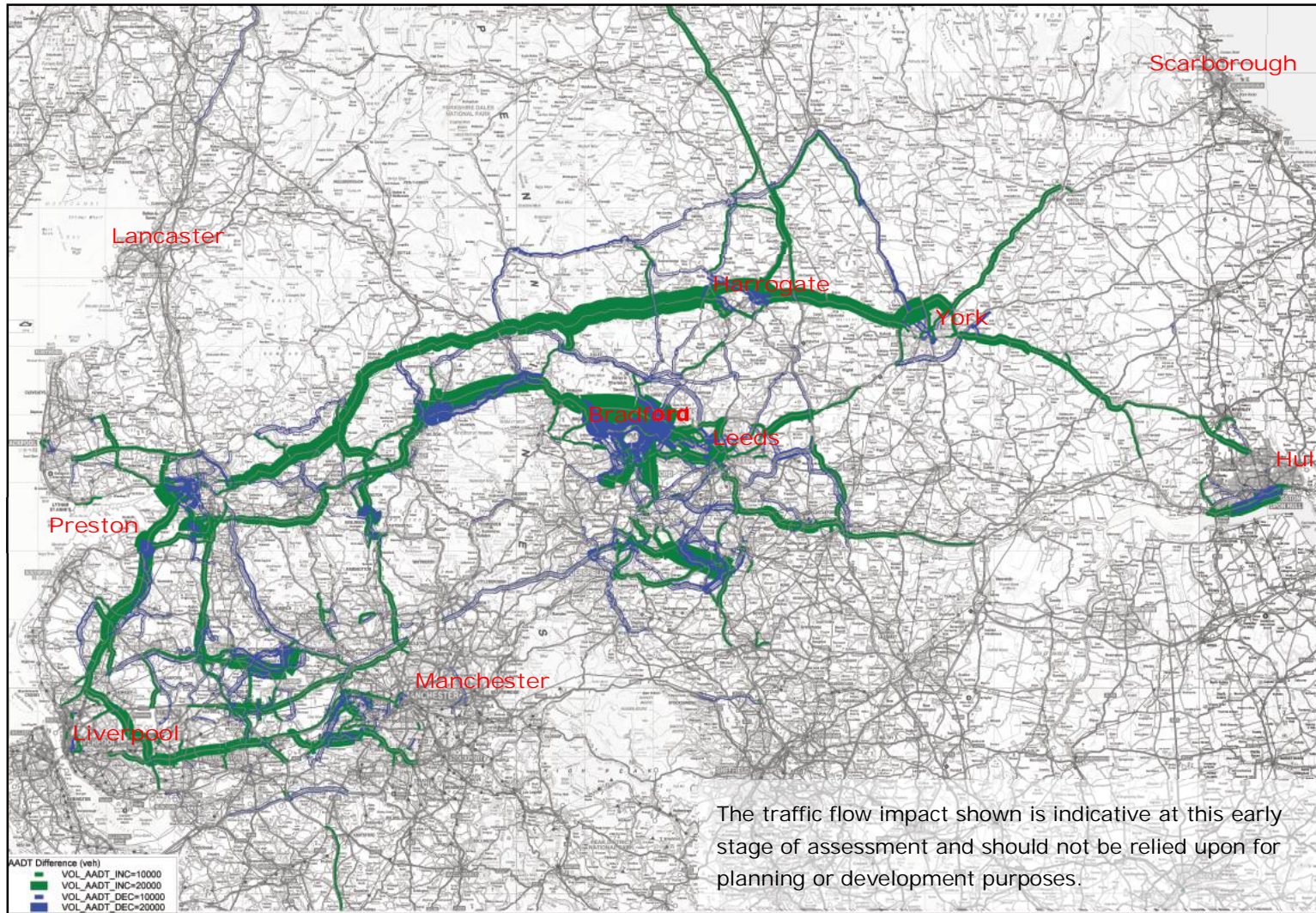
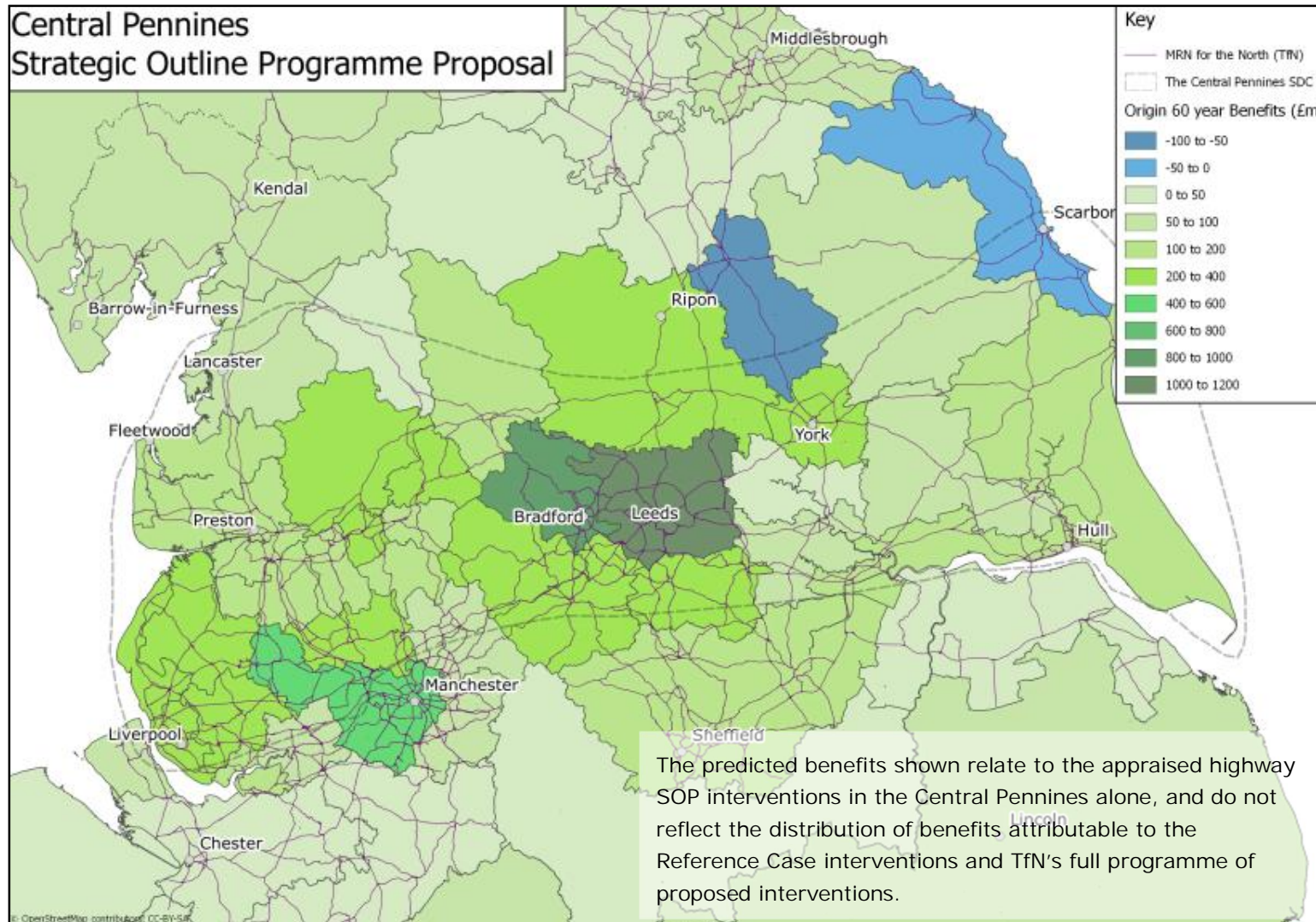


Figure 35: Distribution of Benefits



## Approach to Economic Appraisal

- 10.11 The Economic Appraisal approach has been agreed through TAG and SMG and follows WebTAG guidelines.

### Level One Established Monetised Impacts

- 10.12 Level One user benefits have been appraised using TUBA 1.9.10. This uses the values based on DfT WebTAG economic databook from December 2017. It includes data on the following:

- Values of time and growth in VoT;
- Fuel costs, rates of fuel consumption and changes in vehicle efficiency over time;
- Vehicle occupancies;
- Journey purpose splits;
- Rates of taxation; and
- Carbon values for assessing the impact of the schemes on CO2 emissions

- 10.13 The Level One monetised impacts include:

- Journey time savings;
- Vehicle operating costs;
- Greenhouse gases; and
- Indirect tax revenues.

- 10.14 For this stage of study, level 1 economic benefits have not been quantified for accidents, physical activity, journey quality, noise and air quality.

### Level Two Evolving Monetised Impacts

- 10.15 Level Two benefits will be used to generate an adjusted VfM metric. This will seek to assess the following elements:

- Reliability benefits;
- Static clustering – specific reference to NPIER prime / enabling capabilities;
- Output in imperfectly competitive markets; and
- Labour supply impacts

- 10.16 Level Two static Wider Economic Benefits (WEBs) have been assessed using WITA and is based on agglomeration and decay parameters, incorporating the impacts of WEBs described in WebTAG unit A2-1. This approach to assessing Static WEBs uses WSP's WITA emulation tool which was previously been approved for use on the Trans-Pennine Tunnel Study Stage 0 by Highways England and DfT. This approach has been agreed through TAG and SMG. A full breakdown of the appraisal parameters is documents in the combined economic and forecasting report.

### Level Three Indicative Monetised Impacts

- 10.17 Level 3 benefits have not been quantified as part of the appraisal for this stage of work.

### Non-Monetised Impacts

10.18 Non-monetised impacts form a key component of assessing the overall value for money of a scheme. For the Central Pennines SDC, the following non-monetised assessments have been undertaken:

- Regeneration
- Landscape
- Townscape
- Historic environment
- Biodiversity
- Water environment
- Affordability

### Scope of Economic Appraisal

10.19 The scope of Economic Appraisal has been agreed through TAG and SMG and seeks to provide a robust, yet proportionate, appraisal of the Central Pennines SOP given the current stage of scheme development. This is in line with WebTAG guidelines.

10.20 As presented in Section 15, the overall Value for Money of the Central Pennines SOP will be determined through a consideration of both monetised and non-monetised benefits which fall across the three levels of benefits detailed in preceding section.

10.21 For clarity as to the scope of economic appraisal, Table 12 sets out the monetised and non-monetised assessments undertaken across the three level of benefits.

Table 12 Scope of Economic Assessment for Central Pennines SDC SOP

	Established Monetised Impacts	Evolving Monetised Impacts	Indicative Monetised Impacts	Non-Monetised Impacts
	<i>Included in initial and adjusted metrics</i>	<i>Included in adjusted metric</i>	<i>Considered after metric using switching values approach</i>	
Level	1	2	3	Qualitative
Included in appraisal at this stage	Journey time savings Vehicle operating costs Greenhouse gases Cost to Broad Transport Budget Indirect Tax	Reliability Static clustering Output in imperfectly competitive markets Labour supply		Regeneration Landscape Townscape Historic environment Biodiversity Water environment Affordability



Not included in appraisal	Noise Air Quality Accidents Physical activity Journey quality		Move to more / less productive jobs Dynamic clustering Induced investment Supplementary economy modelling	Security Severance Access to services Option and non-use values
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# 11 Economy Impacts

## Introduction

- 11.1 Following the structure of DfT’s standard AST, this chapter sets out the economic impacts on business users of the SDC Programme, including the Transport Economic Efficiency (TEE) impacts which are represented within the Economic Appraisal. This chapter also contains an assessment of Regeneration and Wider Impacts. The impacts on non-business users (consumers) form part of the social impacts and are covered in chapter 13.
- 11.2 The impact of the Central Pennines SDC programme on the Northern Economy is of particular importance to the VfM case presented in this SPOC given that it is based on identifying the interventions which will unlock delivery of the transformational growth set out within NPIER. However, as set out in paragraph 8.11 the economic appraisal is based on ‘business as usual’ growth as represented in DfT’s NTEM.

## Business Users & Transport Providers

- 11.3 A summary of the business user impact estimated by TUBA is provided in Table 13. Although business users represent a small proportion of the overall trips their high VoT increases the influence on the overall benefits generated.

Table 13 Business User Impact

Business	ALL MODES	ROAD	
		Good Vehicles	Business Cars/LGVs
<i>User benefits</i>	TOTAL		
Travel time	5,378	1,891	3,487
Vehicle operating costs	346	144	201
User charges	-8	-5	-3
Subtotal	5,716	2,030	3,686

*\*Discounted present values, in 2010 prices and values (£m)*

- 11.1 As this SPOC considers the highways impact only the appraisal does not monetise the impact upon Transport Providers and therefore this has not been reported.

### Reliability Impact on Business Users

- 11.2 It is expected that the SDC programme will have a positive impact on reliability due to the improved level of capacity and the provision of alternative routes such as improvements to east-west connectivity providing an alternative to the M62.
- 11.3 Table 14 provides a summary of the estimated reliability impacts on Business Users. This has been calculated as 10% of the travel time benefits generated by TUBA. Using an approach applied on previous projects and with reference to DfT guidance<sup>67</sup>, reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.

Table 14 Business Users Reliability Impacts

	Total
Reliability Impact on Business Users	538

*\*Discounted present values, in 2010 prices and values (£m)*

### Regeneration

- 11.4 With reference to WebTAG Unit A2.2, the schemes included in the Central Pennines SDC programme represent a substantial investment in transport provision across the corridor, which are designed to improve accessibility. Thus, it is considered likely that the Central Pennines SDC programme will generate *strong beneficial* regeneration impacts.

### Wider Impacts

- 11.5 It is expected that the SDC programme will generate strong wider impacts due to improved connectivity linking businesses closer. Due to the absence of active travel and bus costs in the model the WITA agglomeration impacts and labour supply impacts have been reduced by 30%. The output change in imperfectly competitive market is derived from TUBA and therefore not affected by the missing modes. This reduction produces the upper bound wider benefits as reported in Table 15.
- 11.6 The lower bound benefits have been estimated by applying weighted average 'distance decay' and 'agglomeration elasticity' parameters following the WebTAG guidance. This is to test the impact of the large proportion of 'other' employment across the Local Authorities in the SDC area on the wider benefits
- 11.7 Table 15 provides a summary of the Level 2 wider impacts as estimated by WITA.

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<sup>67</sup> DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

Table 15 Level 2 Wider Impacts Summary

WI 1: Agglomeration impacts

	Lower Bound	Upper Bound
Manufacturing	747	238
Construction	188	144
Consumer Services	1,118	694
Producer Services	1,641	3,442
Sub-Total	3,693	4,520

WI 2: Output change in imperfectly competitive market

Sub-Total	369	369
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WI 3: Tax revenues arising from labour market impacts

Labour supply impacts	42	43
Move to more / less productive jobs	0	0
Sub-Total	42	43

Total Wider Benefits	4,104	4,931
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*\*Discounted present values, in 2010 prices and values (£m)*

## Summary

11.8 Table 16 below summarises the Economy impacts:

Table 16 Summary of SDC Programme Economy Impacts

Economy Impacts	
Business user benefits	5,716
Reliability impacts on business users	538
Regeneration	Strong beneficial
Wider Benefits (Level 2)	4,104 - 4,931

*\*Discounted present values, in 2010 prices and values (£m)*

## 12 Environment Impacts

### Introduction

12.1 One of Transport for the North's pan-northern transport objectives is 'Promoting and enhancing the built, historic and natural environment'. Environmental objectives of the STP have been influenced by an Integrated

Sustainability Appraisal (ISA) to ensure that environmental considerations, and sustainability more widely, are embedded throughout the STP. This approach supports TfN in developing and delivering a sustainable Investment Programme that promotes and where possible enhances the environment of the North.

- 12.2 To inform appraisal at the SDC Programme level, an environmental appraisal of the SOP interventions has been undertaken. Following the structure of DfT's standard Appraisal Summary Table (AST), this chapter sets out the potential impacts to the environment of the SDC Programme, particularly noting any disbenefits that may occur.
- 12.3 The potential environmental impacts of the Central Pennines SDC Programme are set out as an Environmental Appraisal<sup>68</sup> report, which takes a relatively high-level view – appropriate to the impacts anticipated from a geographically and temporally dispersed programme of interventions of varying scale and type.
- 12.4 Traffic related environmental topics (i.e. Noise, Air Quality and Greenhouse Gases) have been appraised and scored as part of the SPOC using a high-level, qualitative approach informed by traffic modelling. Environmental impact appraisal scores are provided using WebTAG scoring categories. Given uncertainty in scheme characteristics, the environmental baseline and future trends quantitative appraisal was not considered proportionate or to provide meaningful appraisal at this stage. Quantitative appraisal would be conducted at later stages of scheme development.
- 12.5 Environmental impact appraisal scores for other environmental topics have been appraised using a risk-based approach as it is considered there is too great an uncertainty of the characteristics and environmental impacts of these interventions at this stage to provide a more precise appraisal for these topics. A summary of the potential risks related to these topics is provided below. This has been developed using a precautionary approach, that is the programme as a whole has been assessed according to the most likely risk of potential adverse impacts on the key environmental resources. As business cases for interventions within the SDC individually or in packages come forward, additional environmental appraisal would be undertaken for all topics.

## Noise

- 12.6 The SOP includes a variety of transport interventions with the potential to alter noise levels experienced by sensitive receptors. Offline interventions would expose new receptors to road or rail noise, although there would be positive effects on road noise where traffic is alleviated on existing routes. Online improvements to existing infrastructure have the potential to increase noise levels at receptors through increased traffic flows and speeds. With further scheme development and mitigation such as low-noise surfacing and noise barriers, it is anticipated that effects can be reduced.

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<sup>68</sup> Central Pennines SDC Environmental Appraisal Report (February 2018)

Increasing adoption of electric-propulsion vehicles and modal-shift to rail, encouraged by rail improvements, would also lessen the effects of road noise. Overall however an adverse impact is anticipated due to the likely effects of road interventions included in the SOP.

Score: Moderate Adverse

## Air Quality

- 12.7 Transport interventions included within the SOP have the potential to influence air quality concentrations experienced by sensitive receptors. Offline interventions would expose new receptors to potential exceedances in Air Quality Standards, although there would be positive effects on air pollutant concentrations where traffic is alleviated on existing routes. Online improvements to existing infrastructure have the potential to increase air pollutant concentrations at receptors through increased traffic flow and speeds, including within Air Quality Management Areas, although there would also be positive effects through reducing congestion. Increasing adoption of ultra-low and zero emission vehicles and modal-shift to rail, encouraged by rail improvements, would also lessen the effects of air pollutant emissions. Overall however an adverse impact is anticipated due to the likely effects of road interventions included in the SOP.

Score: Moderate Adverse

## Greenhouse Gases

- 12.8 The SOP has the potential to influence greenhouse gas emissions of transportation, which accounts for approximately a quarter of the UK's carbon dioxide (CO<sub>2</sub>) emissions. Increased traffic flows from road interventions would have a negative effect on greenhouse gas emissions, and construction would involve large amounts of embodied carbon. Reduced congestion, improvements to certain journey times and modal-shift to rail, encouraged by rail improvements, would have positive effects. Increasing adoption of ultra-low and zero emission vehicles would lessen the negative impacts of road traffic over time. However, despite WebTAG assumptions for changing fleet composition of fuel types and increasing fuel efficiency, the SOP is predicted to result in approximately 7.2 million tonnes of CO<sub>2</sub> emissions over a 60 year period due to increasing vehicle flows. As such, overall an adverse impact is anticipated.

Score: Moderate Adverse

## Landscape and Townscape

### *Landscape*

- 12.9 The SOP includes interventions that may fall within or in proximity to National Parks and Areas of Outstanding Natural Beauty (AONB), which are landscapes of the highest national value. SOP interventions also have the potential to impact local landscape designations and degrade the character of landscapes within the SDC. With mitigation it is anticipated that many of these impacts would be minimised but considering the inclusion in the SOP

of offline schemes and schemes within high value landscapes, some adverse impacts are considered likely.

Risk appraisal – likely to have significant adverse effects.

### *Townscape*

- 12.10 SOP interventions have the potential to fall within settlements and as such have the potential to impact physical and social characteristics of the urban environment that comprise townscapes. However, the SOP includes interventions such as bypasses and new links that are anticipated to draw traffic from existing settlements, thereby improving townscape characteristics such as appearance and human interaction.

Risk appraisal – likely to have significant adverse effects.

## Historic Environment

- 12.11 The SOP interventions fall within proximity to a large number of designated heritage assets, including Saltaire and the Lake District World Heritage Sites. The SOP is therefore anticipated to have both direct and setting impacts on heritage assets of international, national and local value. With appropriate consultation and mitigation many of the impacts can likely be avoided or minimised, but the SOP is anticipated to have some residual impacts on heritage assets. However, the SOP has the potential to improve access to certain historic and culturally significant sites, including Saltaire, Liverpool Maritime Mercantile City and the Lake District World Heritage Sites. There may also be opportunities to work with partners and stakeholders to improve the condition and management of heritage assets.

Risk appraisal – likely to have significant adverse effects.

## Biodiversity

- 12.12 The SOP comprises infrastructure development that has the potential to adversely affect the integrity of local, national and international (European) designated sites, and the status and distribution of priority habitats and species. However, it is assumed that TfN's programme of interventions would be delivered in accordance with commitments to no net biodiversity loss. Furthermore, there is the potential to deliver any necessary biodiversity mitigation or compensation to contribute to strategic local and national biodiversity priorities and protect and enhance biodiversity through green infrastructure. The SOP comprises many improvements to existing highways and rail infrastructure, of which the proposed works undertaken through the SOP may present opportunities to enhance the environmental performance of this infrastructure.

Risk appraisal – likely to have significant adverse effects.

## Water Environment

- 12.13 Both offline and online SOP schemes risk exposing watercourses to increased risk of transport related pollution. While it is considered that these impacts can likely be mitigated, the SOP would present increased risk of adverse impacts to the inland water environment. There may however

also be opportunities to enhance the water environment, although these cannot be identified at this stage.

Risk appraisal - potential to have significant adverse effects.

## Summary

- 12.14 The SOP includes road and rail improvements and new infrastructure that would change noise levels and air pollutant concentrations at sensitive receptors, increase emissions of greenhouse gases and risks impacts on environmental assets. This includes a risk of adverse impacts to environmental assets of international value, such as the Yorkshire Dales National Park, Areas of Outstanding Natural Beauty (AONB) and several European designated wildlife sites. The SOP further has the potential for impacts on other designations of national and local value, and adverse impacts to environmental resources such as landscape character, ecological networks and the setting of cultural heritage assets.
- 12.15 It would be the intention of TfN and its partners to ensure environmental impacts are minimised. With further environmental assessment and option development, and where necessary mitigation and compensation, it is anticipated that impacts can be minimised or avoided through careful design and appropriate mitigation, and in some cases, opportunities identified for environmental enhancements. Following this process, the majority of the SOP interventions are likely to comply with relevant policy and contribute to the objective of the STP to 'promote and enhance the natural, historic and built environment', and further objectives established in the Integrated Sustainability Appraisal (ISA). However, as a result of their nature and location some interventions present a high risk of significant environmental effects and therefore a risk of failing to comply with policy, legislation and STP objectives. These interventions have been identified in the Environmental Appraisal Report.
- 12.16 Interventions proposed through this study would be taken forward through other separate commissions to Strategic Outline Business Case (SOBC) in line with the Department for Transport's Transport Business Case approach. This would include more detailed consideration of individual interventions or groups of interventions, for which appropriate environmental appraisal would take place. Subsequently, any schemes would undergo further environmental assessment through the Highways England Project Control Framework (PCF) process or Network Rail Governance for Railway Investment Projects (GRIP) process or local authority or Nationally Significant Infrastructure planning consent processes. This is likely to include an Environmental Impact Assessment (EIA) for many of these schemes, a process that would lead to production of an Environmental Statement (ES). The environmental impacts of these schemes would inform the consenting authority's decision.

## 13 Social Impacts

### Introduction

- 13.1 Following the structure of DfT's standard AST, this chapter sets out the potential impacts to the social impacts of the SDC Programme, including the TEE impacts (Commuting and Other Users, and Personal Affordability) which are represented within the Economic Appraisal.

### Commuting and Other Users

- 13.2 Table 17 provides a summary of the impacts on consumer users (time only) as estimated by TUBA. A full set of impacts on commuting and other users is reported in the personal affordability section and the TEE table.

Table 17 Summary of Consumer User Impacts

Consumer Users	Private Cars / LGVs
Non-Business Commuting Travel time	2,046
Non-Business Other Travel time	1,808
Subtotal	3,854

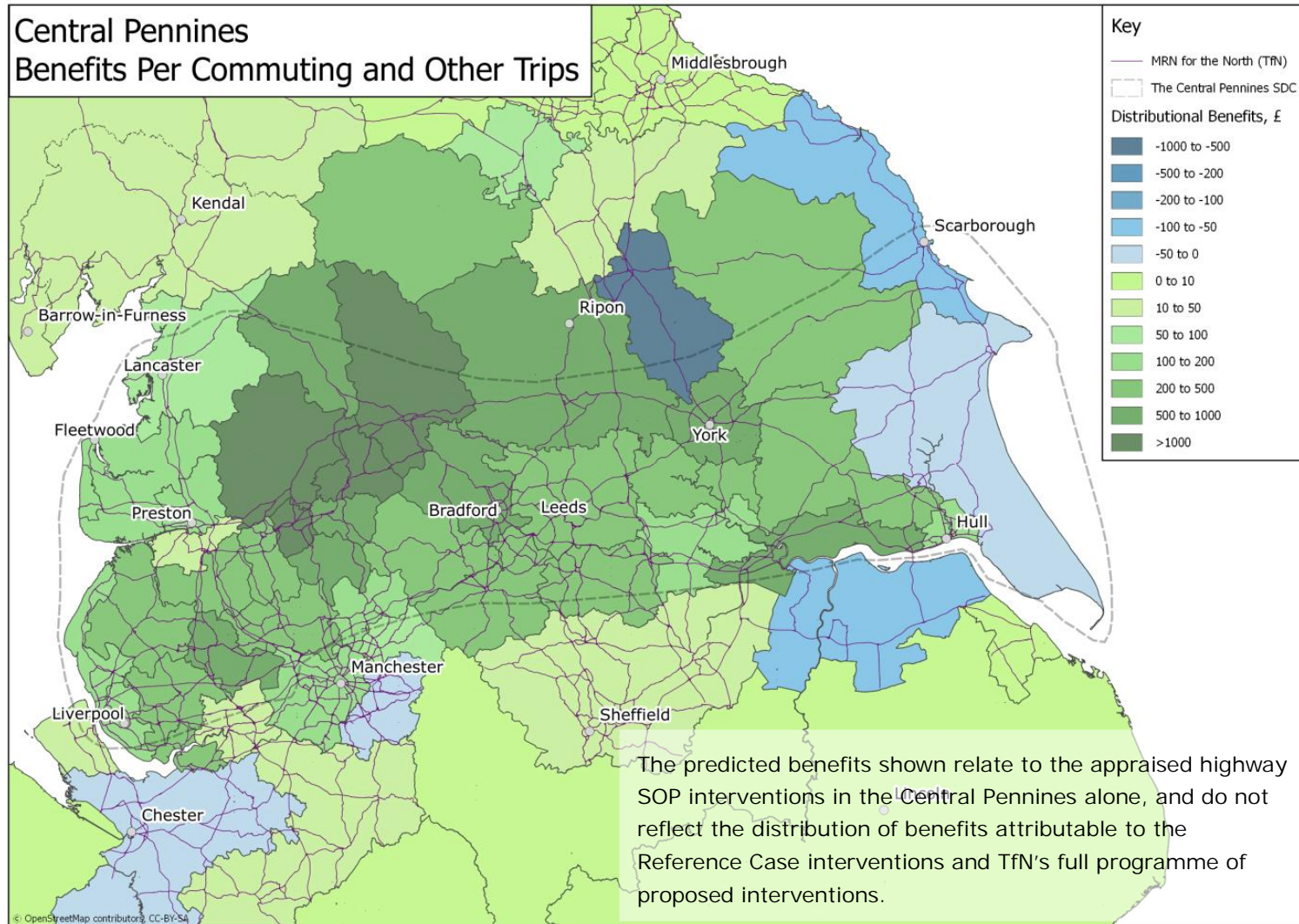
*\*Discounted present values, in 2010 prices and values (£m)*

### Distributional Impacts

- 13.3 Figure 36 overleaf provides a spatial summary of the economic benefits. This considers the distribution of commuting and other benefits divided by the commuting and other trips. Business related trips are excluded from this analysis.
- 13.4 This shows that the greatest level of benefits per trips is concentrated in Lancashire. Small dis-benefits are generated towards the east in Scarborough and Hambleton. This is due to increases in flow caused by nearby interventions (A64 and A59 corridor) which result in minor reductions in speed within Scarborough and Hambleton. It is expected that further development of the interventions and local highway improvements would help to mitigate any disbenefits.



Figure 36: Distributional Impacts



## Reliability impact on Commuting and Other Users

13.5 Using an approach applied on previous projects and with reference to DfT guidance<sup>69</sup>, reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.

13.6 Table 18 provides a summary of the reliability benefits for commuting and other users.

Table 18 Commuting and Other Users Reliability Impacts

Reliability Benefits	Total
Non-Business Users Commuting	205
Non-Business Users Other	181
Sub-Total	385

*\*Discounted present values, in 2010 prices and values (£m)*

## Personal Affordability

13.7 At this early stage of appraisal, and for the purposes of this SPOC, an indication of the impact on Personal Affordability has been quantified using the TUBA outputs for vehicle operating costs and user charges for non-business users. The results estimated by TUBA are shown in Table 19. Error! Reference source not found..

Table 19 Commuting and Others Affordability

Non-Business: Commuting	
Vehicle Operating Costs	-156
User Charges	2
Sub-Total	-155
Non-Business: Other	
Vehicle Operating Costs	-423
User Charges	0.9
Sub-Total	-422
Commuting and Other Total	-577

*\*Discounted present values, in 2010 prices and values (£m)*

13.8 The results show an aggregate increase in vehicle operating costs over the 60-year appraisal period with a Central Pennines SDC programme of investment in place compared to the Reference case. This is attributable to an increase in total vehicle kilometres travelled and as a result higher fuel consumption and vehicle maintenance costs. The increase in vehicle kilometres travelled is a reflection of the improved connectivity brought about by the SOP highway interventions and an increase to travel to work catchment areas. In doing so the SOP provides the North's residents with increased opportunities to travel for work, leisure and other interests which

<sup>69</sup> DfT, 2013. Value for Money Assessment: Advice Note for Local Transport Decision Makers

in qualitative terms is considered to be beneficial from a personal affordability perspective.

- 13.9 Figure 36 shows the distribution of non-business benefits across the SDC area and demonstrates the benefits gained across the corridor. It is noteworthy, that the predicted benefits shown relate to the appraised highway SOP interventions in the Central Pennines alone, and do not reflect the distribution of benefits attributable to the Reference Case interventions and TfN's full programme of proposed interventions.

## Summary

- 13.10 Table 20 below summarises the Social impacts:

Table 20 Summary of Social Impacts

Social Impacts	
Commuting and Other Users	3,854
Reliability impact (Commuting & Other Users)	385
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-577
Severance	Not Assessed
Option and Non-use values	Not Assessed

*\*Discounted present values, in 2010 prices and values (£m)*

## 14 Public Accounts Impacts

### Introduction

- 14.1 This chapter outlines the impact of the Central Pennines SDC programme on public accounts. These form the derivation of two key outputs described below: the impact on the Broad Transport Budget (which forms the cost represented within the Benefit Cost Ratio (BCR)), and the indirect taxation impact on Wider Public Finances (HM Treasury (HMT), represented as an adjustment to the benefits within the BCR).

### Cost to Broad Transport Budget

- 14.2 As set out within the Financial Dimension and section 9, the construction, operation and maintenance costs associated with the Central Pennines SOP have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.
- 14.3 For the Central Pennines SOP, all Investment Costs have been assumed to be incurred in 2034, with all Operating Costs assumed to be incurred in

2035. No profiling of either Investment Costs or Operating Costs has been assumed within the Central Pennines economic appraisal.

- 14.4 With reference to the process set out in Figure 33, Table 21 presents the Central Pennines SOP scheme costs in the format of the DfT's CPSS Cost Proforma Summary Sheet. This shows the build-up of the scheme costs from 2017 Base Costs through to 2010 discounted market prices representing the SOP investment costs.

Table 21 DfT's CPSS Cost Proforma Summary Sheet

Item	£m	Unit
Base Cost	7,144	2017 prices
Risk	7,144	2017 prices
OB	10,174	2017 prices
Inflation	18,560	2017 prices inflated to 2034
GDP Deflator	11,741	2010 prices
Market Prices	13,972	2010 market prices
Discounting	6,119	2010 discounted market prices
O+M Uplift (10%)	6,732	2010 discounted market prices
PVC	6,730	2010 discounted market prices

## Indirect Tax Revenues

- 14.5 Implementation of transport interventions can result in an impact on HM Treasury tax receipts. This results from changes in fuel consumption, from changes in travel distance and/or speed of mode shift to public transport, affecting the fuel duty received by HM Treasury. Table 22 provides a summary of the Indirect Tax Revenues as estimated by TUBA.

Table 22 Indirect Tax Revenue Benefits

Indirect Tax Revenues	ALL MODES
Wider Public Finances	-590

*\*Discounted present values, in 2010 prices and values (£m)*

## Summary

- 14.6 The relevant impacts are summarised in the form of standard DfT 'Public Accounts' tables for the SDC Programme (Table 23) under NTEM growth.

Table 23 Public Accounts Table for the SDC Programme (NTEM Growth Scenario)

	ALL MODES
Local Government Funding	TOTAL
Revenue	0
Operating Costs	0
Investment Costs	0
Developer and Other Contributions	0
Grant/Subsidy Payments	0
NET IMPACT	0

Central Government Funding: Transport	
Revenue	0
Operating Costs	613
Investment Costs	6,117
Developer and Other Contributions	0
Grant/Subsidy Payments	0
NET IMPACT	6,730
Central Government Funding: Non-Transport	
Indirect Tax Revenues	-590
TOTALS	
Broad Transport Budget	6,730
Wider Public Finances	-590

\*Discounted present values, in 2010 prices and values (£m)

## 15 Value for Money

### Introduction

- 15.1 A VfM appraisal of the Central Pennines SDC Programme has been undertaken with reference to DfT’s Transport Appraisal Guidance<sup>70</sup> as current at May 2018.
- 15.2 This chapter brings together the economic appraisal results presented in the preceding sections and considers their inherent uncertainty, other quantified and qualitative impacts, and distributional impacts. The Value for Money (VfM) assessment summarises the monetised and non-monetised impacts of the appraised corridor interventions with; highways, passenger rail and road & rail freight considered separately.
- 15.3 The chapter concludes by summarising the next steps for appraising the programme level impacts.

### Economic Appraisal

- 15.4 Monetised analyses from the economic, environmental, social and public accounts impacts, from the preceding chapters come together as the Economic Appraisal of the SDC Programme. DfT’s BCR represents the ratio:

$$\text{net-non-transport-budget impacts} : \text{net-transport-budget impacts}$$

The latter being represented by the cost to broad transport budget and the former by the sum of all other impacts, as set out in the following text.

DfT’s second VfM indicator is the Net Present Value (NPV); the sum of all monetised impacts.

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<sup>70</sup> <https://www.gov.uk/guidance/transport-analysis-guidance-webtag>

## Transport Economic Efficiency

- 15.5 The travel time, cost and financial impacts on consumers and the private sector are summarised in the form of standard DfT 'TEE' tables for the SDC Programme (Table 24) under NTEM growth. This table combines the impacts on *Commuting and Other Users* (Social impacts, from chapter 13) and on Business Users and Transport Providers (Economic impacts, from chapter 11).

Table 24 TEE Table for the SDC Programme

Non-business: Commuting	
<i>User benefits</i>	
Travel Time	2,046
Vehicle operating costs	-156
User charges	2
During Construction & Maintenance	0
<b>NET NON-BUSINESS BENEFITS: COMMUTING</b>	<b>1,892</b>
Non-business: Other	
<i>User benefits</i>	
Travel time	1,808
Vehicle operating costs	-423
User charges	0.9
During Construction & Maintenance	0
<b>NET NON-BUSINESS BENEFITS: OTHER</b>	<b>1,385</b>
Business	
<i>User benefits</i>	
Travel time	5,378
Vehicle operating costs	346
User charges	-8
During Construction & Maintenance	0
<b>Subtotal</b>	<b>5,716</b>
<i>Local Authority provider impacts</i>	
Revenue (toll charges)	4
Operating costs	0
Investment costs	0
Grant/subsidy	0
<b>Subtotal</b>	<b>4</b>
<i>Other business impacts</i>	
Developer contributions	0
<b>NET BUSINESS IMPACT</b>	<b>5,720</b>
<b>Present Value of Transport Economic Efficiency Benefits</b>	<b>8,998</b>

\*Discounted present values, in 2010 prices and values (£m)

## Initial DfT Economic Appraisal

15.6 A standard DfT 'Analysis of Monetised Costs and Benefits' (AMCB) table is presented below for the SDC Programme (Table 25) under NTEM growth. The AMCB table illustrates the calculation of the initial (Level 1) BCR:

- The Present Value of Benefits (PVB) equals:
  - § TEE Impacts (from Table 24)
  - § Monetised Environmental Impacts (Greenhouse Gases from TUBAError! Reference source not found.)
  - § Indirect Tax Revenues (from Table 22)
- The Present Value of Costs (PVC) equals:
  - § Cost to Broad Transport Budget (from Table 21)

Table 25 AMCB Table for the SDC Programme

Noise	Not Monetised
Local Air Quality	Not Monetised
Greenhouse Gases	-322
Journey Quality	Not Monetised
Physical Quality	Not Monetised
Accidents	Not Monetised
Economic Efficiency: Consumer Users (Commuting)	1,892
Economic Efficiency: Consumer Users (Other)	1,386
Economic Efficiency: Business Users and Providers	5,720
Wider Public Finances (Indirect Taxation Revenues)	590
Present Value of Benefits (PVB)	9,266
Present Value of Costs (PVC)	6,730
<b>OVERALL IMPACTS</b>	
Net Present Value (NPV)	2,536
Benefit to Cost Ratio (BCR)	1.38

*\*Discounted present values, in 2010 prices and values (£m)*

## Adjusted (Level 2) and Indicative (Level 3) Economic Appraisals

15.7 The initial (Level 1) BCR presented above does not include monetised Wider Economic Impacts, see Table 25; DfT's guidance includes of Level 2 impacts<sup>71</sup> within an 'Adjusted' BCR. DfT's VfM guidance sets out VfM categories ranges as follows:

- Very Poor Adjusted BCR less than or equal to 0.00
- Poor Adjusted BCR between 0.00 and 1.00
- Low Adjusted BCR between 1.00 and 1.50
- Medium Adjusted BCR between 1.50 and 2.00
- High Adjusted BCR between 2.00 and 4.00
- Very High Adjusted BCR greater than or equal to 4.00

15.8 Table 26 sets out the derivation of Initial and Adjusted BCRs for the SDC Programme under the NTEM Scenario.

Table 26 SDC Programme (NTEM Scenario): Initial and Adjusted BCRs

	Initial BCR (Level 1)	Adjusted BCR (Level 2) Lower Bound	Adjusted BCR (Level 2) Upper Bound
AMCB PVB	9,266	9,266	9,266
Static clustering	NA	3,695	4,520
Dynamic clustering	NA	NA	NA
Imperfect competition	NA	369	369
Labour supply impacts	NA	42	43
Reliability	NA	923	923
Present Value of Benefits (PVB)	9,266	14,294	15,120
Present Value of Costs (PVC)	6,730	6,730	6,730
Net Present Value	2,536	7,564	8,390
Benefit Cost Ratio	1.38	2.12	2.25
VfM Category	Low	High	High

*\*Discounted present values, in 2010 prices and values (£m)*

## Appraisal Summary Table

15.9 An AST which allows comparison of the impacts of the SDC programmes under different growth scenarios is presented as Table 27. DfT Standard ASTs, which include a summary justification for the scoring of each impact,

<sup>71</sup> Chapter 10 – paragraphs 10.11 to 10.17



for the scenarios separately are provided in the Combined Transport Forecasting and Economics Report.

Table 27 Comparative Appraisal Summary Table

	NTEM Scenario
<b>Economy Impacts</b>	
Business user benefits	5,716
Reliability impacts on business users	538
Regeneration	Strong beneficial
Wider Benefits (Level 2)	4,104 - 4,931
<b>Environment Impacts</b>	
Noise	Moderate Adverse
Air Quality	Moderate Adverse
Greenhouse Gases	Moderate Adverse
Landscape	Likely to have significant adverse effects
Townscape	Likely to have significant adverse effects
Historic Environment	Likely to have significant adverse effects
Biodiversity	Likely to have significant adverse effects
Water Environment	Potential to have significant adverse effects
<b>Social Impacts</b>	
Commuting and Other Users	3,854
Reliability impact (Commuting & Other Users)	385
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-577
Severance	Not Assessed
Option and Non-use values	Not Assessed
<b>Public Accounts</b>	
Cost to the Broad Transport Budget	6,731
Indirect Tax Revenues	-590

*\*Discounted present values, in 2010 prices and values (£m)*

## Value for Money Statement

- 15.10 The Value for Money (VfM) Assessment summarises the monetised and non-monetised impacts of the appraised corridor interventions. Highways, passenger rail and road & rail freight are shown separately.
- 15.11 The assessment appraisal undertaken is WebTAG based, utilises industry standard appraisal methodologies and uses DfT traffic forecasts. However, the Reference Case includes scheme which are not committed.

### Appraisal of Highway Interventions

- 15.12 The appraisal of highway interventions in the Central Pennines SDC are set out below in Table 28. These are initial results, which will be re-evaluated as TfN take forward further work on modelling and appraising the SDC programme.

Table 28 Summary of highway appraisal

Value for Money Assessment		
Established Monetised Impacts (journey times/operating costs):		
Established Monetised Impacts of appraised highway interventions £9,266m	Net Cost to the Transport Budget of appraised highway interventions £6,730m	Initial Ratio of Benefits to Costs 1.38
Initial Value for Money Category		Low
Evolving Monetised Impacts (plus wider economic impacts/reliability):		
Established + Evolving Monetised Impacts £14,294– 15,120m	Net Cost to the Transport Budget £6,730m	Provisional Ratio of Benefits to Costs 2.12 – 2.25
Provisional Value for Money Category		Medium - High
<p><b>Non-monetised Impacts</b></p> <p>A fundamental aim of TfN and Partners is to protect and enhance, where possible, the natural and historical assets of the North.</p> <p>The Central Pennines SDC programme includes interventions that risk potential adverse impacts on environmental receptors, including designations of international to local value such as European designated wildlife sites, close or within National Parks and Areas of Outstanding Natural Beauty and heritage assets, amongst others. These impacts will be carefully considered in subsequent stages of work and TfN and partners will seek to protect and enhance natural and historic assets, where possible, through the individual scheme development process. There, however, remains the potential for residual adverse impacts.</p> <p>The environmental disbenefits of additional travel in terms of noise, air pollutant and carbon emissions from transport, will offset some of the economy benefits captured within the provisional categorisation. Accordingly, given that the lower end of the range is close to the category threshold, it is concluded that an appropriate prudent overall categorisation is Medium Value for Money, in which there can be commensurately higher certainty at this very early stage of scheme development.</p>		
Adjusted Value for Money Category		Medium

## Appraisal of Passenger Rail Interventions

- 15.13 The Rail SOP has been developed around TfN’s objectives to develop and enhance connectivity and accessibility in the North, whilst promoting sustainable growth. Interventions were defined in accordance with the Desirable Minimum Standards in the Long Term Rail Strategy, which have demonstrable alignment to the pan-Northern transport objectives set out in the STP. The SOP has been designed to improve rail connectivity across the North of England.
- 15.14 The passenger rail economic appraisal is at a northern level, so includes costs and benefits of appraised rail interventions within the Central Pennines and within the other Strategic Development Corridors. Table 29 summarises the results of the rail appraisal.
- 15.15 In addition to the monetised wider impacts in Table 29, the Rail SDC programme has been assessed as having strong beneficial regeneration impacts. It is anticipated that investment in transport infrastructure will result in significant benefits to the North’s economy, accelerating, maximising and more-widely distributing the transformational growth and benefits of the major infrastructure investment projects within the reference case. Further detailed evidence on the Appraisal of Rail Passenger interventions is available on TfN’s website at: [www.transportforthenorth.com](http://www.transportforthenorth.com).

Table 29 Summary of passenger rail economic appraisal

Established Monetised Impacts of appraised rail interventions	Net Cost to the Transport Budget of appraised rail interventions	Initial Ratio of Benefits to Costs
£464m	£424m	1.10
Initial Value for Money Category		Low

### Freight Benefits

- 15.16 The benefits of the programme of interventions for road and rail freight have been appraised using the Great Britain Freight Model and are reported at a GB and a Northern Level. The results, summarised in Table 30, provide a strong indication of the economic benefit of supporting freight growth in the North of England.
- 15.17 The freight scenarios that have been used include looking at the impact of larger ships, warehouse clustering and rail capacity. These scenarios cannot be aggregated together as they rely on particular economic conditions and private sector investment.

Table 30 Summary of Freight Benefits of the Strategic Outline Programme

Freight Scenario	Present Value Benefits (£million 2010 prices) <sup>72</sup>		
	Allocated to the North	Allocated Elsewhere	Total
Benefits of Highways SOP for the North (freight vans)	£3,020	£170	£3,190
Benefits of Highways SOP for the North (heavy goods vehicles)	£844	£195	£1,039
Benefits of re-routing interventions (Based on 4 additional rail freight routes)	£2,213	£3,789	£6,002
Benefit of removing rail freight capacity limits	£1,683	£4,080	£5,763
Benefit of warehouse clustering	£1,886	£3,731	£5,597
Benefit of Port measures (larger ferries)	£761	£1,929	£2,690

- 15.18 The approach to assessing freight interventions is detailed further in a separate report available on TfN's website at: [www.transportforthenorth.com](http://www.transportforthenorth.com).

#### Analytical Certainty

- 15.19 Transport for the North's Technical Assurance Group (TAG) has reviewed and approved all methodologies employed within the Central Pennines economic appraisal and derivation of benefits. Highway and passenger rail scheme costs have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.
- 15.20 The appraisal methodology is therefore considered sound and reasonable for this very early stage of scheme development.

#### Summary of VfM

- 15.21 The costs and benefits demonstrated above show that the transport interventions appraised identified in our SOP represent value for money based on the evidence currently available, giving a justified basis for progressing the case for investment in this corridor.

#### Next Steps

- 15.22 In the next year, TfN plans to update the Strategic Programme Outline Cases to inform an update of the Investment Programme. This will include work on reviewing the current SDCs and Investment Programme, including

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<sup>72</sup> Benefits cannot be treated as cumulative or added directly to the assessment of highway and rail benefits

the sequencing of schemes. The next stage of modelling will include transformational NPIER<sup>73</sup> forecasts and the latest spatial planning information.

- 15.23 The appraisal will move to a single assessment tool for the North, able to report at pan-Northern and corridor levels, so removing of the issues of double counting of benefits. This approach will also better incorporate the multi-modal impacts of passenger rail and freight.
- 15.24 The reference case assumptions will be updated, so reflect the latest plans for the schemes such as NPR and Trans-Pennine tunnel.
- 15.25 The initial work on the wider economic benefits (WITA) will be progressed, moving from Level 2 (static assessment) to Level 3 (dynamic assessment), and include the updates in WebTAG.
- 15.26 As more definitive scheme definitions emerge, scheme costings will be reviewed, and the environmental appraisal will adopt the more detailed WebTAG methodologies.

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<sup>73</sup> Northern Powerhouse Independent Economic Review

## Financial Dimension

The Financial Dimension of a business case sets out to demonstrate is to set out the impact of the proposal on public sector capital and revenue budgets.

### 16 Introduction

- 16.1 The Financial Dimension sets out the approach to estimating implementation costs for the Central Pennines Strategic Development Corridor (SDC) programme of interventions. 'Whole life' costs are estimated, including ongoing maintenance, periodic renewals and - for Rail Passenger and applicable Freight Road and Rail only - operating costs. These costs, converted into suitable appraisal values, form a key input into the cost benefit appraisal, described in the preceding Economic Dimension.
- 16.2 The programme-level cost estimating process is necessarily high-level at this time; combining interventions of different scales, natures and complexities. The approach taken has built-in consistency across the programme, effectively implicitly assuming reasonable balance in the variation above/below estimate. There are further advantages of programme delivery at this scale in respect of cost estimates; principally in terms of the ability to refine the programme as experience is accumulated and lessons are learnt, for example improving the efficiency of procurement and adjusting intervention delivery timings and specifications to maximise value for money (VfM).

#### Approach to Financial Appraisal

##### Highway Intervention Costs

- 16.3 Initially, the unit rate based approach developed for the Major Road Network report was adopted. This methodology was reviewed and approved by both TAG and the Department for Transport (DfT). Notwithstanding, it was decided that owing to the complexity of some of the SDC SOP schemes there would be benefit from additional external assurance. Accordingly, TfN commissioned an independent review of the unit rates alongside a more detailed costing exercise for a small number of schemes across each of the SDCs.
- 16.4 This review concluded that the unit rate methodology was sound and provided updated unit rates, drawn from industry knowledge and records of scheme cost information, including some which was not publicly available. The updated unit rates were accepted by TfN for use in this Strategic Programme Outline Case (SPOC).
- 16.5 The sample SDC schemes were costed using a methodology consistent with Highways England's strategic-level estimating process which incorporated all construction costs, design and preparation, land costs, enabling works,

supervision, statutory undertakers and third-party infrastructure costs. This provided a 2017 'scheme base cost' on top of which factors were applied to represent Project Risk and Uncertainty. The risk allowances applied are consistent with Highways England submissions.

#### Rail Intervention Costs

- 16.6 A similar 'unit cost' based approach was adopted for rail schemes, with unit rates in this case based initially on publicly available data. For route improvements, unit rates per mile were derived for bands based on the journey time saving, as a proportion, identified. Costs for new or substantially upgraded intermediate stations were also derived. Network Rail and DfT Rail were consulted about these rates, the cost per intermediate station being increased as a result. No other amendments to the rates were suggested, or alternative evidence provided; it is therefore assumed that cost estimates based on these rates are appropriate for the current stage of delivery.

#### Freight Intervention Costs

- 16.7 Intervention costs specific to freight have not been developed at this very early stage of work<sup>74</sup>.

#### Inflation

- 16.8 Convention for the Financial Dimension is to present costs in nominal terms (sometimes referred to as outturn or cash terms), that is inclusive of all inflation. Intervention cost estimates have been inflated to 2035 using BCIS cost inflation indices, for the purposes of the Economic Dimension - where interventions have been represented as being implemented in a single year. Further inflation has been applied to costs presented within this Financial Dimension, to represent in broad terms the anticipated phasing of intervention delivery.

## 17 Implementation Funding Requirement

### Funding Requirement

- 17.1 The illustrative SDC programme funding requirement for appraised (within the Economic Dimension) and non-appraised interventions is set out in Table 31. The indicative costs which underline the funding requirements are based on high level benchmarked unit rate cost estimates appropriate to this early stage in the business case development cycle.
- 17.2 This represents an ambitious but realistic funding requirement for a long term programme of transport investment, building upon the reference case schemes, to be delivered over the period up to 2050.

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<sup>74</sup> Other general highway intervention costs that would benefit road freight traffic are included within the highway cost assumptions.

- 17.3 Following the structure of the SPOC documentation, costs for highway interventions are provided for the four separated SDC corridors, whereas passenger rail intervention costs are presented at a combined northern level.

Table 31 Illustrative Funding Requirement (£ millions in 2017 prices)

SPOC	Appraised Programme	Non-Appraised Programme	Full Programme
Highway: Central Pennines	£7,144	£334	£7,478
Highway: Connecting the Energy Coasts	£2,158	£170	£2,328
Highway: Southern Pennines	£3,115	£583	£3,698
Highway: West and Wales	£3,281	£1,578	£4,859
Passenger Rail: North	£505	£6,100	£6,605
Sub Total <sup>75</sup>	£14,896	£8,575	£23,471
TfN Programme Level Contingency (5%) <sup>76</sup>			£1,174
Total Base Cost (including programme contingency)			£24,645
Illustrative Funding Requirement (allowing for inflation)	£40,000 to £50,000		

## Funding Arrangements

- 17.4 A key element of the Strategic Transport Plan (STP) will be how the infrastructure proposed by TfN, as set out in the Investment Programme, will be funded over the period until 2050. TfN has therefore developed a Funding Framework that will form the basis of the funding section of the STP as well as informing the business cases for Northern Powerhouse Rail (NPR) and the interventions arising from the work on the SDCs.
- 17.5 The approach that TfN has adopted to the development of the Funding Framework has been grounded in the fundamental principles that were agreed by the Partnership Board in December 2016. KPMG was appointed in June 2017 to support TfN in this work.
- 17.6 The TfN Funding Framework was discussed at the Partnership Board on 31 July 2018 and amended to reflect the comments made by the members. In

<sup>75</sup> Double counting of interventions in more than one SDC removed.

<sup>76</sup> A single TfN programme-level contingency allowance has been applied for the purposes of illustrating the overall funding requirement. The programme-level allowance reflects the assumption that not every intervention or package of interventions would require the full level of contingency allowed.



addition, it was presented to the Scrutiny Committee meeting on 30 August 2018, where it was endorsed and recommended for approval by the TfN Board (noting that it will need to consider the more detailed proposals as and when these are developed).

- 17.7 The TfN Funding Framework includes the following elements:
- a) The Principles – which underpin a deliverable and appropriate funding arrangement
  - b) The Potential Funding Sources – demonstrating that TfN's funding requirement is reasonable
  - c) The Governance Arrangements that will enable funding allocated for strategic transport infrastructure in the North to be directed to TfN programmes
  - d) How Financial Risk is managed.
- 17.8 The Funding Framework also sets out the parameters within which the allocation and management of the financial resources required to deliver the objectives of the STP will be undertaken.
- 17.9 The key points to note within the TfN Funding Framework are as follows:
- a) The total funding envelope identified by TfN is deliverable within the context of a reasonable expectation of what funding might be made available. This is consistent with the National Infrastructure Commission's position as set out in the National Infrastructure Assessment. TfN is therefore not making unreasonable financial demands on central government – the decision to fund TfN is a choice that can be made by government within existing paradigms, based on robust programmes.
  - b) TfN does not have the power to capture value created by its promoted interventions – where these powers do not sit nationally, they sit locally with TfN's Constituent Authorities or other local authorities. These local authority powers have principally been granted to fund activity on a local rather than a regional basis. Where local plans are sufficiently developed, it is likely that those local powers will be fully utilised funding transport infrastructure within authorities and cannot be relied on to fund strategic (i.e. national) infrastructure.
  - c) The TfN Funding Framework will be integrated with the pipeline of programmes and projects that is presented by TfN in the STP and the accompanying Investment Programme. Further work is required to understand the impact of the timing of those projects and the resultant profile of proposed funding through to 2050, although there has been some initial work done for the pre-2027 period.
  - d) The TfN Funding Framework also identifies where residual risks sit in relation to the funding of TfN promoted interventions and how this will be managed. Neither TfN nor its Constituent Authorities are in a position to back-stop the risks associated with TfN's proposals and therefore as things stand this role will need to be taken on by central government. However,

TfN could become the owner of programme risks, which would mirror some of the effects of financial risk taking.

- 17.10 In the longer term, the TfN Funding Framework will provide the basis for further detailed work that will include the following activity:
- Engage with DfT, HM Treasury (HMT) and central government more widely to agree and define exactly what form the proposed budgetary decision-making control would take and demonstrate how it would enhance delivery of infrastructure in the North.
  - Engage with Members and other stakeholders to further understand their ambition and consider any consequential impacts on TfN governance arrangements.
  - Develop the detail of the proposed funding powers and associated risk management mechanisms and how these might be delivered.
  - Consider how these powers and responsibilities would impact on TfN and its Constituent Authorities (including an assessment of potential financial impacts) and in particular, any additional resources that might be required to discharge them.
  - Consider how the proposed changes would impact on DfT, partner bodies (including delivery agencies), and identify how new processes could be adopted (including the transition to the proposed arrangements).

## 18 Operational Life Funding Requirement

### Introduction

- 18.1 In addition to the implementation costs (above) cost benefit appraisal takes account of future costs for maintenance and renewal, for example the delivery of additional infrastructure may place additional liabilities on the public sector to keep it in operational condition.

### Maintenance and Renewal

- 18.2 A present value equivalent to 10% of the implementation costs is applied, to represent highway maintenance and renewal costs, based on experience from across the project team. This assumption is to be appropriate given the current stage of delivery.
- 18.3 The same adjustment, equivalent to 10% of implementation costs in present value terms, was made to represent passenger rail and freight intervention maintenance and renewal costs for consistency with highway schemes.

## Operating Costs and Revenue

- 18.4 A high-level estimate of rail operating costs was made based on changes in service km, noting that neither operating costs nor passenger revenues were included in the rail economic appraisal. This represents a prudent assumption, based on the constraint that revenue from any rail interventions must exceed service operating costs.

## Commercial Dimension

The Commercial Dimension of a business case sets out to demonstrate that the proposals are commercially viable, outlines the applicable procurement options and introduces the approach for engaging with the market.

### 19 Introduction

- 19.1 The Commercial Dimension sets out the procurement strategy to engage the market and the proposed approach to risk allocation. Given the programme is at a relatively early stage, this Commercial Dimension seeks to further clarify Transport for the North's (TfN's) role in procurement and risk acceptance, demonstrate that the various procurement options available and market capability are being considered, and establish that there is a clear procurement approach in place to deliver, as a minimum, the next phase of the study. The Commercial Dimension will be developed in further detail at Strategic Outline Business Case (SOBC) and Outline Business Case (OBC) stage.
- 19.2 The short list of interventions in the Central Pennines Strategic Development Corridor (SDC) forms a divisible programme of works. This provides flexibility in the scale and timing of delivery of the interventions. Given this flexibility, many routes to market are available. Due to the programme being both multi-modal and structured around a series of packages, it is likely that a number of separate scheme promoters and delivery contracts will be required, including both engineering contracts and franchise commitments for rail. Given the anticipated timescales for delivering such significant interventions, it is likely that the procurement options available to the scheme promoters, particularly in terms of specific contracts, will change during the lifecycle of the project. Therefore, the commercial and procurement strategy will evolve as the scheme design/scope develops.

### 20 Approach to Procurement

#### Procurement Regulations Context

- 20.1 Department for Transport (DfT), TfN and the delivery partners procure works and services in compliance with EU Procurement Directives and UK Regulations. DfT, TfN, Highways England and HS2 Ltd procure through the Public Contract Regulations whilst Network Rail qualifies as a Utility Company under the EU Utility Directive and procures works and services through the Utilities Contract Regulations.

- 20.2 For bespoke procurements, where the requirements are out of the scope of the frameworks, TfN and delivery partners undertake discrete Official Journal of the European Union (OJEU) compliant procurements.
- 20.3 Looking ahead, future work and services with respect to the SDCs will be procured by the agreed delivery body. TfN will lead on further business case development at the Pan-Northern / SDC level. Beyond that stage works and services will be procured by the appropriate delivery entity, yet to be determined. For example, this could include Highways England for Strategic Road Network (SRN) schemes, Network Rail and Local Transport Authority partners.

## Market Assessment

- 20.4 This section provides an overview of the capabilities and capacity of the supplier market, any gaps which exist between current capabilities and those likely to be required to deliver the programme, and considerations for engaging with the market prior to procurement. Market analysis is a key aspect, both in terms of informing the scheme design, operational/maintenance requirements and the route to procurement. As the study moves forward, it will be critical to remain at the forefront of market developments, understanding lessons learnt from other major schemes as well as gaining an appreciation of who in the market has the capability to deliver the interventions and packages. The skillsets required to implement the schemes are similar to those required for other regional and national highway and rail projects.
- 20.5 The divisible nature of the programme provides flexibility if necessary to fit supplier availability. However, it is noted that TfN's wider programme is large and includes many interventions that will need to be delivered contemporaneously, including with large committed investments promoted and delivered nationally or otherwise outside TfN. TfN will work closely with delivery agencies as well as the broader transport industry to ensure a joined-up approach to skills. In delivering the Investment Programme, the focus will be on maximising social value for local areas, a sustainable pipeline of skills, and diversity within the workforce.
- 20.6 Where capability or capacity gaps are identified, options will be suggested for addressing them. These options could take broadly two forms:
- Increasing capability/capacity to close any gaps, including;
    - Working alongside the market and further education establishments to address skills gaps and release new capacity into the market.
    - Collaborating with the private sector to enhance innovation.
  - Reducing/reprofiling the requirement to be deliverable by the existing market; including;
    - Working with infrastructure owners to identify more efficient way of working (for example enabling lengthier access to rail infrastructure or combining enhancement work with routine maintenance/renewal activity.)
- 20.7 It is likely that a combination of these actions will be necessary.

- 20.8 The timing of the interventions (see Management Case) provides an opportunity for scheme promoters to ensure suppliers offer the correct skillsets as new framework and term maintenance contracts are let. More detailed market analysis will be undertaken as part of the next stage and updated as technologies in construction and within the complementary industries develop.

### Sponsorship/Procurement Options Available

- 20.9 The multi-modal and divisible nature of the Central Pennines programme provides an opportunity to select the best sponsorship and delivery model for each intervention/package of interventions.
- 20.10 Project sponsorship options include:
- DfT
- 20.11 Under this option, DfT would retain sole accountability for the governance of a project and for ensuring that it meets the objectives set out in the Strategic Dimension. A close working relationship with the delivery agent will be required, with clearly defined processes for decision-making, communications and escalation. Dependent on the preferred delivery model (see below), this option would have the advantage of building from prior experience and utilising an existing toolkit of project processes. DfT would require a means of monitoring that the long term critical success factors (that is, making a positive contribution to the economic growth of the North of England).
- TfN
- 20.12 Here, TfN would take sole accountability for the success (in terms of meeting both the short and long term objectives) of a project, and take on the day-to-day Sponsor role during delivery of the infrastructure elements of the project. The advantages of this option include the geographic proximity of TfN's operations to the project site, the key linkages between the project's objectives and those set out in TfN's Strategic Transport Plan, and the existing communications processes between TfN and its partner authorities as key stakeholders.
- DfT & TfN Joint Sponsorship
- 20.13 In this option, DfT and TfN would take on a joint Sponsorship role, collectively owning the business case and accountability for delivery of project objectives. This option has the advantage of being able to utilise DfT's organisational experience and tools, and TfN's communications management structures and North of England base. It also provides an opportunity for TfN to gain project Sponsorship experience without taking on sole accountability. A clear plan would be required setting out individual roles within the sponsorship team and lines of decision-making and escalation, to mitigate any risk associated with joint sponsorship.

### TfN Local Transport Authority Partner Sponsorship

- 20.14 Following the principle of subsidiarity, where a TfN Local Transport Authority partner is best placed to act as Sponsor TfN will work with that Local Transport Authority to support further business case development, management of and delivery of an intervention or package of interventions. This approach is most likely to be a preferred option for interventions on local transport / highway authority managed roads.

### Private Sector Sponsorship

- 20.15 There could also be opportunities for private sector investment within the Programme, such as market-led rail proposals and a number of combined transport and energy proposals. Transport for the North will examine each of these proposals closely as and when the necessary information is available.

- 20.16 Delivery options include:

- Commissioning via agencies (Network Rail, HS2 Ltd and Highways England);
- Direct contractor appointment;
- Alternative mechanisms (franchising, alliancing, ODP)
- Commissioning via TfN's Partner Authorities

### Design, Build & Maintain (Network Rail/HS2 Ltd/Highways England)

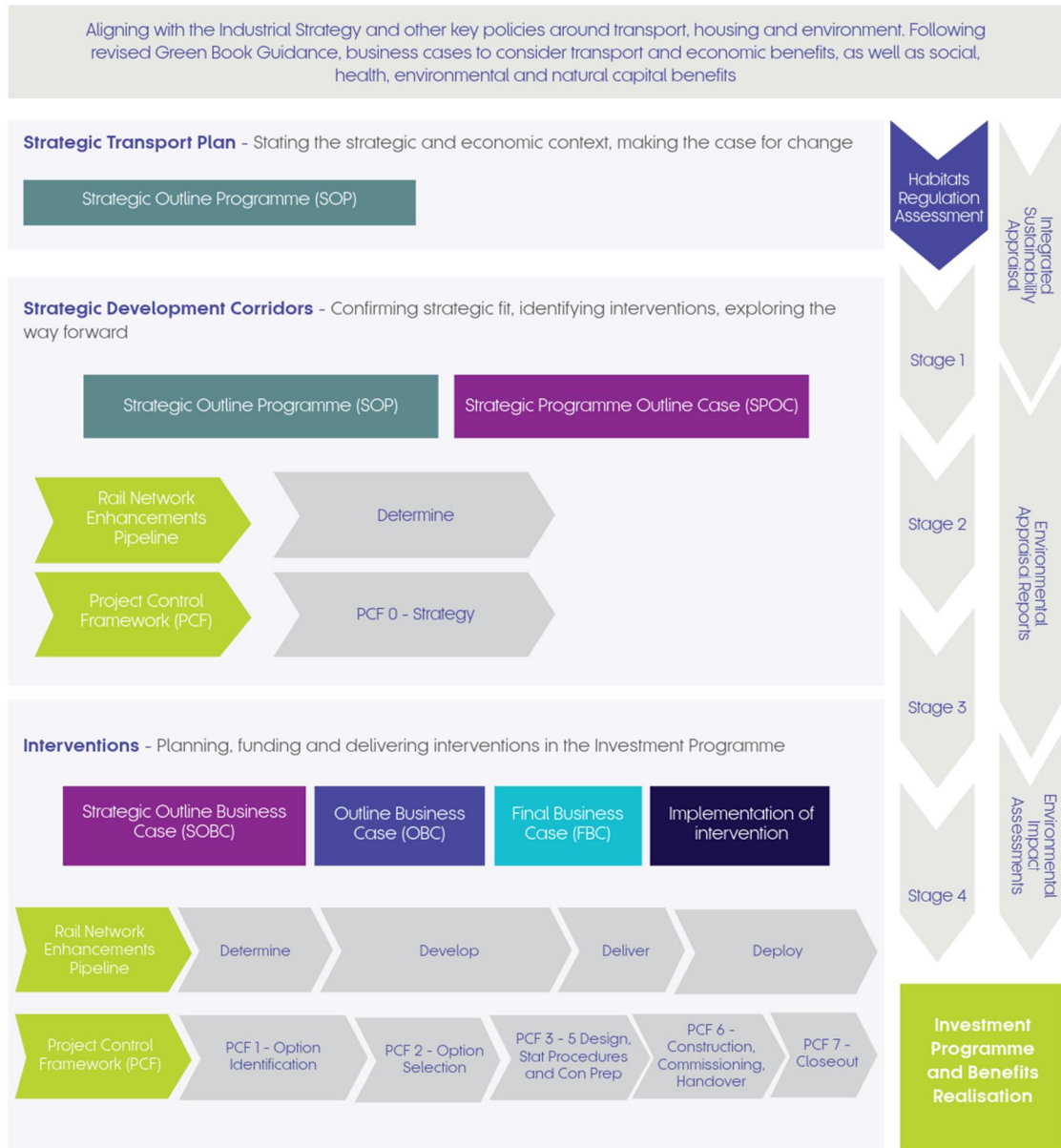
- 20.17 Under the Design, Build & Maintain model, the Sponsor would appoint an agent responsible for completing [detailed] scheme design and subsequent construction. Traditionally, Network Rail has undertaken this role for DfT, utilising [sub-]contractors where required. In this respect this option has the advantage of utilising a 'tried and tested' method, without the risks associated with a more innovative approach. It would also enable the 'lessons learned' from the delivery of recent enhancement projects to be embedded within the process for planning and delivering this scheme.
- 20.18 It is anticipated that many of the interventions will be delivered through framework and term maintenance contracts held by Network Rail, local authorities and Highways England.
- 20.19 It is likely that the schemes within the Central Pennines programme would not fall within the extant CP5 process for managing the delivery of enhancements. This creates a number of options for allocating key roles of project sponsor and delivery agent. A brief description of each option is set out below to inform further discussion.

### *Assurance*

- 20.20 While not all interventions within the programme fall within the remit of Highways England and Network Rail, at this stage it is assumed that assurance stages will be consistent with the Highways England's Project

Control Framework<sup>77</sup> (PCF) and Network Rail Governance for Railway Investment Projects (GRIP) processes, as relevant by intervention/package. These frameworks set out how Highways England and Network Rail, together with the DfT, manage and deliver major projects in phases/stages and are described in more detail in the Management Case. Both processes require a phased approach to procurement and approval, which can be applied separately by intervention/package as the programme moves through to later stages.

Figure 37 Investment Programme Development Process



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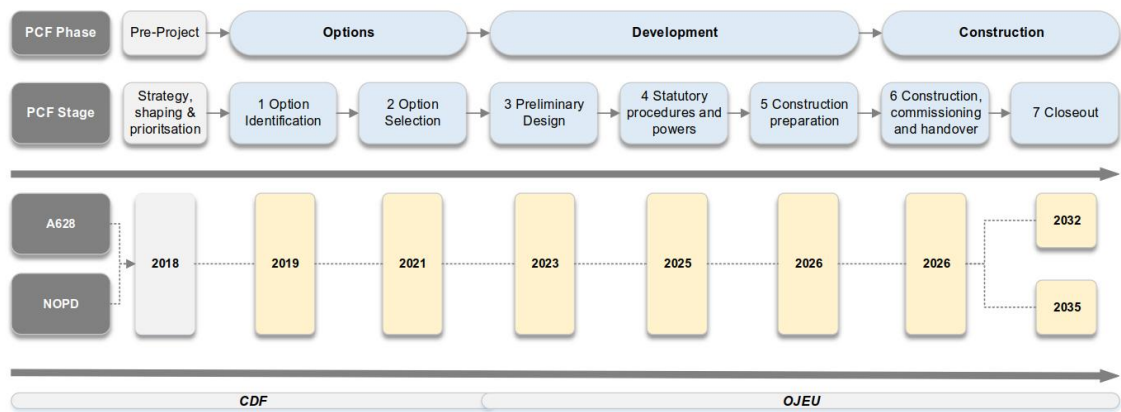
## Market Engagement

- 20.21 DfT, TfN and delivery partners have established procurement frameworks and, as mature clients, have long term relationships with their suppliers. Each organisation uses its market intelligence to inform their strategy for procuring works and services.
- 20.22 TfN encourages potential suppliers to register their interest using a form on the TfN website. TfN retains these contacts so that when projects are ready for launch, a potential supply chain is already in place.
- 20.23 For complex tenders, TfN regularly invites bidders to Supplier Engagement meetings at which bidders learn about what TfN is trying to achieve, and is also an opportunity for bidders to input into the Specification and the Procurement tender plan.

### Procurement timelines

- 20.24 Figure 38 illustrates the anticipated procurement timeframes, commencing with further programme refinement and SOBC development.

Figure 38: Example from Trans-Pennine Tunnel



## 21 Next Steps

- 21.1 TfN will lead on further business case development at the Pan-Northern/Strategic Development Corridor level, including seeking and prioritising funding for schemes. Beyond that stage, works and services will be procured by the appropriate delivery entity, yet to be determined. For example, this could include Highways England (for Strategic Road Network schemes), Network Rail and local transport authority partners.

## Management Dimension

The Management Dimension of a business case sets out to demonstrate that the proposals are deliverable, including describing proposals for:

- Programme governance
- Stakeholder engagement
- Risk and opportunities management
- Monitoring and evaluation

## 22 Introduction

- 22.1 The Management Dimension assesses whether a proposed intervention is deliverable. It provides a clear understanding of what needs to be done, why, when and how, with measures in place to identify and mitigate any risks<sup>78</sup>.
- 22.2 This section provides a high-level outline of the programme governance and the management systems put in place to oversee the development phase of the programme of investments. Additionally, this dimension presents an overview of the programme and the approach to stakeholder engagement, risk management and monitoring and evaluation to ensure the successful delivery of the programme.
- 22.3 As illustrated in the Strategic Dimension, the proposed programme will be a large range of multi-modal interventions varying in scale and scope distributed along the Central Pennines corridor. Therefore, the programme will most likely be delivered in distinct phases. This approach will include a number of early 'priorities for delivery'.

## 23 Programme Governance

### Introduction

- 23.1 This section describes the governance arrangements necessary to oversee the Strategic Development Corridor (SDC) programme at various stages in its lifecycle.

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<sup>78</sup> DfT. (2013). The Transport Business Cases. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/85930/dft-transport-business-case.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf) [Accessed: 26/09/2018]

## Governance Structure

- 23.2 As the body responsible for managing issues at a strategic level across the North, Transport for the North (TfN) is leading the development of a multi-modal package of schemes to implement in the Central Pennines corridor. The Strategic Programme Outline Cases (SPOC) for the SDCs provide a key part of the evidence base for TfN's Strategic Transport Plan (STP) and Investment Plan. This sets out TfN's proposals for investment in transport across the North.
- 23.3 TfN, as the statutory transport body for the North, is the voice of the North of England for transport - a partnership of elected and business leaders from across the whole of the North of England who collectively represent all of the region's 16 million citizens.
- 23.4 An overview of the governance structure is shown below in Figure 39.

Figure 39 SDC Governance Structure



- 23.5 Reflecting TfN's governance arrangements, partners have been engaged and have contributed to the development of the Strategic Outline Programme (SOP) for this corridor throughout its lifecycle. This includes participation and approvals during scheme identification, objective setting, sifting, option refinement and economic appraisal processes.
- 23.6 The Programme Board includes representatives from the following organisations: Combined Authorities, Local Transport Authorities and Local Enterprise Partnerships in the North, Department for Transport, Network Rail, Highways England, High Speed 2 Ltd. This board has provided direction, technical scrutiny and oversight throughout the development of the proposed set of interventions.
- 23.7 The Partnership Board has agreed on the governance structure for TfN including the establishment of an Executive Board including TfN and DfT to oversee the work of individual work streams. Programme boards and delivery groups have also been created to advise and support the work of the Partnership Board and its Committees.

## Roles & Responsibilities

- 23.8 The SPOC for the corridor provides a key part of the evidence base for TfN's Strategic Transport Plan and Long-Term Investment Plan, which sets out TfN's proposals for investment in transport across the North.
- 23.9 Setting clear roles and responsibilities and single point accountability for different areas of work is vital to supporting effective project planning, delivery and decision making.
- 23.10 TfN is accountable for owning the vision for the proposed programme and integrating and aligning it with the wider TfN Strategic Transport Plan, the wider Northern Powerhouse agenda and key government strategies.
- 23.11 TfN will provide the overall direction, governance and leadership, including chairing the Programme Board, further developing, refining and sequencing the package of interventions to facilitate the implementation of the proposed programme. TfN's role is overarching, in order to maintain a healthy alignment between the programme and wider Departmental and Government strategies, while engaging with HM Treasury, Cabinet Office, Infrastructure and Projects Authority and other key governmental stakeholders. TfN will also be responsible for managing the key strategic risks facing the programme and ensuring that the views of the local authority partners are represented.

## Programme Management Arrangements and Assurance

- 23.12 Within TfN, as the Senior Responsible Officer (SRO), the Major Roads Director is accountable for delivery of the SDC Strategic Outline Programme (SOP) Case.
- 23.13 Following completion and TfN Board endorsement of the SPOC, TfN will maintain responsibility for owning and promoting the SDC programme. This will include the completion of further development work during 2019/20 to refine, package and sequence the proposed delivery of the SOP.
- 23.14 Through the governance structure TfN will work with partners to review and update the STP Investment Programme, and to determine which partner organisation will take lead responsibility for progressing business case development for specific interventions or packages of interventions.
- 23.15 As stated in the Commercial Dimension, assurance processes will be consistent with Highways England and Network Rail where relevant. These include Highways England's 'Project Control Framework' (PCF)<sup>79</sup> and the Network Rail 'Governance for Railway Investment Projects' (GRIP)<sup>80</sup> processes. According to these frameworks, a programme lifecycle needs to be clearly defined, broken into phases and structures around key milestones. Approval to proceed from one stage into the next must be given

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<sup>79</sup> Highways England (2017), The Project Control Framework Quick Reference Guide

<sup>80</sup> HM Treasury. (2018). A short 'plain English' guide to assessing business cases

by the Senior Responsible Owner (SRO) and this is assessed at a stage gate assessment review (SGAR). The application of these proven 'Codes of practice' will ensure the effective assurance of the proposed programme of interventions.

## 24 Programme Lifecycle and Sequencing

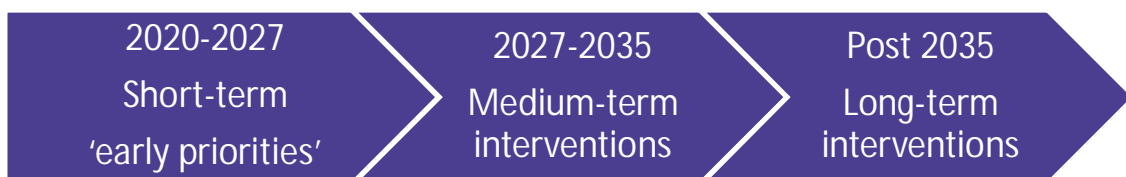
### Introduction

- 24.1 The proposed programme of interventions across the Central Pennines SDC comprises multi-modal investments to be delivered over time. The delivery of these schemes will require a comprehensive plan that carefully phases investment to ensure affordability, whilst balancing disruption, mitigation and enhancement of environmental impact and the realisation of benefits to the residents and businesses of the North of England. The interdependencies with committed schemes, such as HS2, and programmed road schemes are also a key factor to consider when developing the delivery plan.
- 24.2 This section presents the emerging delivery programme for the Central Pennines SDC.

### Outline Delivery Programme

- 24.3 The programme of investments proposed for the Central Pennines corridor includes a large number of schemes, which will likely be delivered over a number of years. This programme is in early stages of development and therefore this Management Dimension focuses on the development phase.
- 24.4 It is envisaged that a number of early 'priorities for delivery' will be taken forward to Strategic Outline Business Case (SOBC) in 2019/2020 to be delivered between 2020-2027. Overall, a programme of short (up to 2027), medium (2027-2035) and long term (post 2035) interventions will be developed.

Figure 40 High-level delivery programme



- 24.5 In the next year, TfN plans to update the Strategic Programme Outline Cases to inform an update of the Investment Programme. This will include work on reviewing the current SDCs and Investment Programme, including the sequencing of schemes. The next stage of modelling will include transformational NPIER forecasts and the latest spatial planning information.

- 24.6 As in the first stage of the development of the SDCs, TfN will fully engage with DfT, local partners, national delivery bodies, transport operators and other key stakeholders. This will ensure that partners and stakeholders contributions inform and help shape our delivery programme.

### Interfaces with other schemes

- 24.7 As the programme is further developed, it will be key to consider how the proposed interventions interface with other schemes being planned for this geographical area. Key schemes in the corridor to consider will include:
- HS2
  - Great North Rail Project
  - Highways England Road Investment Strategy 2 investments including Manchester North-West quadrant and Trans-Pennine Tunnel
  - Northern Powerhouse Rail
  - Other major developments of national and regional importance
  - Local schemes
- 24.8 The full list of schemes included in the Reference Case is available in the Strategic Dimension.

## 25 Stakeholder Management and Communications

### Introduction

- 25.1 Effective stakeholder management and consultation is fundamental to achieving the objectives of the programme. This section presents an overview of TfN's engagement with key stakeholders so far as well as an overview of TfN's approach to future stakeholder engagement and communications.

### Stakeholder Engagement Plan

- 25.2 At the start of the development of the SPOC, a Stakeholder Engagement Plan (SEP) was produced to map stakeholders and agree a communications plan throughout the option development process and preparation of the SPOC.
- 25.3 The SEP included:
- Aims and objectives
  - Situation analysis
  - Stakeholder mapping
  - Engagement methods
- 25.4 Since the start of the development of the programme of investments in the Central Pennines SDC and following the SEP, TfN has engaged with a significant number of national, regional and local stakeholders. These include:

- Local authorities
- Local Transport Authorities
- Local Enterprise Partnerships
- Combined authorities
- Highways England
- Network Rail
- HS2
- DfT
- Homes England
- Large private businesses, including rail and airport operators
- Railfuture
- Community Rail Partnerships
- Historic England
- Transport Focus
- Chambers of commerce and other organisations representing businesses
- Tourism organisations

25.5 The purpose of this engagement was to define the outcomes to be achieved through investments in the SDCs and identify which multi-modal solutions are required to deliver these outcomes.

25.6 TfN held different stakeholder consultation sessions in the form of workshops and interviews throughout 2018. Details on the specific consultation sessions held to inform the options development and assessment process can be found in the Strategic Dimension. Further rounds of stakeholder engagement are planned in 2019 to share the outcomes of the SPOC.

## 26 Risk and Opportunities Management

### Introduction

26.1 The SDCs' risk management is undertaken in line with TfN's Risk Management Strategy (RMS). The RMS provides a framework for managing risks in a consistent manner by applying systematic methods and practices to the task of identifying and assessing risks and opportunities which in turn allows mitigation measures to be identified and implemented to reduce or optimise the effects. This provides a disciplined environment for proactive decision-making.

### Risk Management

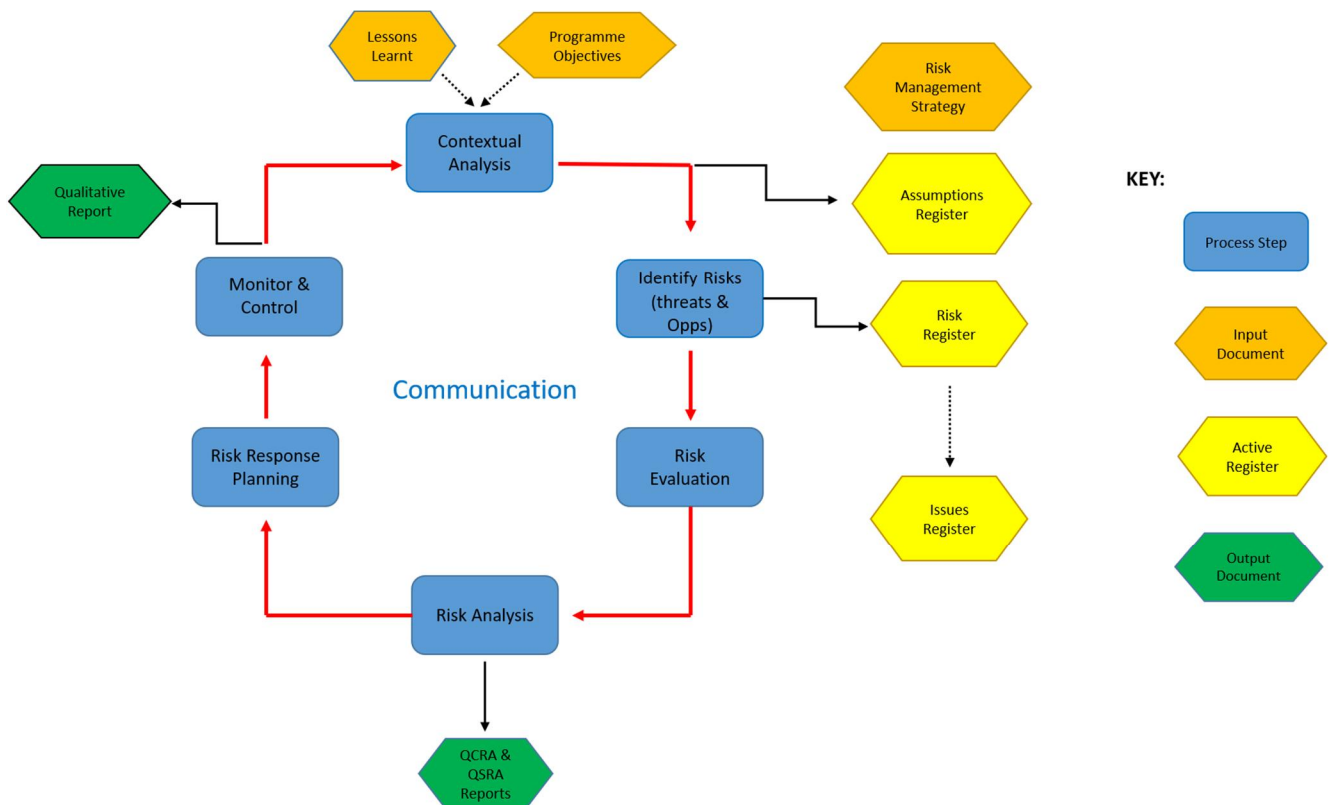
26.2 The risk management approach is an iterative process through which risks are continually identified, assessed and managed by the programme team. Adopting best practice, TfN's risk management process is sub-divided into six key steps listed below:

- Contextual Analysis
- Identification of Risk
- Risk Evaluation

- Risk Analysis
- Risk Treatment
- Monitor & Control

- 26.3 Collectively, these steps form a logical sequence, necessary for the adoption of a robust approach to the implementation of the risk management with the SDC programme.
- 26.4 The SDC team maintain an up-to-date programme risk register, which is reviewed and updated regularly and an on-going basis by risk and mitigation action owners. The programme has adopted a robust and rigorous bottom-up risk management reporting where emerging risks are proactively captured, existing risks reviewed and re-assessed, and new risks identified.
- 26.5 TfN's efficient and effective risk reporting process allows management to be informed on the key threats and opportunities that require attention at a higher level.
- 26.6 Figure 41 provides an overview of TfN's risk management process. A description of key stages is provided below.

Figure 41 TfN's Risk Management Process



### Contextual Analysis

- 26.7 This step requires the manager to collate the maximum amount of information with regard to the scope of the activity, thus enabling the identification of risks that may have an impact upon TfN's objectives.



Information collated will assist in defining appropriate probability and impact scoring.

#### Identification of Risks

- 26.8 TfN will undertake a comprehensive contextual analysis to enable the identification of risks that may have an impact upon TfN's objectives. Based on the contextual analysis, threats and opportunities will be identified that inform the risk identification process. Identified risks will be summarised in a risk register which includes risk categories and risk descriptions. TfN will organise a comprehensive programme risk register and regularly update it with emerging risks being proactively captured.

#### Risk Evaluation

- 26.9 The programme team will utilise designed a qualitative risk scoring criteria to enable the assessment of the risks and opportunities. This will generate a qualitative risk ranking (risk score) by multiplying the probability with the maximum of the impacts for each risk identified in the risk register. The risks with the highest risk scores will be prioritised analysed in more detail and reported for review and decision-making.

#### Risk Analysis

- 26.10 Risk analysis will be undertaken to determine the aggregated effect of the threats and opportunities on an activity. This will include consideration of any interdependencies or mutual exclusivity between risks.

#### Risk Treatment

- 26.11 For risk treatment/mitigation, a process for selecting the most suitable response strategy to the management of individual or groups of risks will be chosen. These are applied to both threats and opportunities. Appropriate ownership will be identified in the risk register for all risks, together with the associated mitigating actions.

#### Risk Monitor and Control Stage

- 26.12 This is an essential process step by which the risk planning measures are monitored and controlled. Usually conducted as part of regular risk reviews. The output of this process step will allow for corrective action to be taken should the risk planning measures be judged as not working effectively and thus further actions may be required.

## 27 Monitoring and Evaluation

### Introduction

- 27.1 The monitoring and evaluation of benefits is required to assess the extent to which the scheme meets its core objectives as set out in the Strategic Dimension. TfN will develop a thorough monitoring strategy and evaluation plan complying with DfT (HMT) requirements<sup>81</sup>.

### Approach to Monitoring and Evaluation

- 27.2 Monitoring is the systematic collection and analysis of data as a project progresses, aimed at improving the efficiency and effectiveness of a project or organisation. This data can be fed back into implementation, current decision making and the appraisal process to improve future decision making. It requires the collection of data before implementation to act as a baseline.
- 27.3 The monitoring strategy for this programme will set out data requirements, potential data sources and how the data will be obtained and monitored at the start of the project (baseline) at various intervals during the project (milestones) and at the end of the project (target) to help assess the trajectory of outputs and impacts.
- 27.4 The evaluation plan, to be developed as the programme development progresses, will describe in detail the proposed evaluation approach and how it fits with the existing evidence base and monitoring strategy. The plan will be developed following guidance contained in the Magenta Book<sup>82</sup>, the Government's guidance on evaluation. All interventions will require a decision on whether to carry out a formal independent evaluation or not. This decision will be based on the scale of the investment and the need for evaluation<sup>83</sup>. The evaluation plan may draw on existing evaluation processes where relevant, for example Highways England's Post Opening Project Evaluation (POPE) for road schemes.
- 27.5 To date TfN has undertaken some work into monitoring the current economic baseline across the North as evidenced in the Northern Powerhouse Independent Economic Review (NPIER) and the STP. More work will be undertaken as the programme for investment in the SDCs develops. As TfN develops its process for monitoring and evaluation it is important that an assessment is made against the current metrics available to critically assess measurement validity.

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<sup>81</sup> HM Treasury. (2018). A short 'plain English' guide to assessing business cases.

<sup>82</sup> HM Treasury. (2011). The Magenta Book

<sup>83</sup> DfT. (2013). Monitoring and Evaluation Strategy

## Benefits monitoring and realisation

- 27.6 Transport for the North will also develop a benefits realisation strategy in the next phase. This will ensure that the key objectives for the scheme, as laid out in the Strategic Dimension, are met. An effective benefits realisation strategy will include:
- Creation of a benefits register that links the expected benefits from the programme to the overall strategic goals. This would include identification of the benefit and the proposed metric that will be used to measure it (for example, time savings, overall demand figures, etc).
  - Nomination of the organisation or directorate that is accountable for realising the benefit. In some cases, such as public realm improvements or specific local interventions, this may be an organisation other than TfN such as local authorities.
  - Arrangements for ensuring that benefits monitoring is at the heart of scheme decision-making.
  - Monitoring and updating, to ensure that the benefits are on-course to be realised.
  - Consideration of how benefits from each individual scheme can be isolated and properly evaluated.

## 28 Management Dimension Summary

- 28.1 This chapter has discussed the deliverability of the proposed programme of interventions for the Central Pennines corridor. It demonstrated that plans and governance structures are in place, as well as how they might change in future. It has also included a description of the arrangements for engaging with internal and external stakeholders and those for managing risks.
- 28.2 The Management Dimension also highlights the importance for effective risk management and monitoring and evaluation. Finally, the methodology for monitoring and evaluation of benefits was described. This is necessary to assess the extent to which the scheme meets its core objectives as set out in the Strategic Dimension.

## 29 Glossary

Term	Acronym	Definition
Benchmark		tbc
Concept		High level approach to delivering interventions (for example an offline bypass).
Enabling Capabilities		The capabilities of the North which are additional to the prime capabilities: education; financial and professional services; and logistics.
Garden Village		A self-contained community of between 1,500 and 10,000 homes.
Gross Value Added	GVA	The measure of the value of goods and services produced by an area, industry or sector of an economy.
Intervention		A potential (loosely defined) scheme which would deliver a benefit.
Local Enterprise Partnership	LEP	A voluntary, business-led, strategic partnership between local authorities and businesses, responsible for promoting and developing economic growth.
Major Road Network	MNR	A network of economically important roads vital for transformational growth
Northern Powerhouse Independent Economic Review	NPIER	Outlines the opportunities to transform the North.
Option		A more specific approach to delivering an intervention (for example a three-lane offline bypass to the west of a city). Given our current level of development, we should talk in terms of 'concepts' and not 'options'.
Package		A group of interventions that are linked by geography or technology.
Pan-Northern		Refers to transport schemes which fit within TfN's remit
Phasing		To do with a method of delivery for a package or intervention which sees its delivery staggered to release benefits / cause disruption over a certain timeframe.
Prime Capabilities		The four areas where the North is highly skilled and globally competitive, as identified by the NPIER: advanced manufacturing; health innovation; energy; and digital.
Programme		A large set of projects/packages/interventions, which for the purposes of our work are specific to an SDC.
Project		A project could be an intervention on its own or a package, but in any case, would generally be defined in its scope by a decision to procure it from the market – as such, we will not be at a level of development where this is a useful term, and it is proposed not to refer to 'projects' in the SPOCs.
Rail North Partnership		Acts on behalf of TfN and DfT to manage Northern and Trans-Pennine rail franchises
Reference Case		The 'do-minimum' scenario developed by TfN including the likely future interventions that aim to increase connectivity across the region

Term	Acronym	Definition
Sequencing		The process of establishing when packages/interventions should be progressed, and should generally follow the convention of 2020 – 2025, 2025 – 2035, 2035 – 2050.
Strategic Development Corridor	SDC	An area where evidence suggests investment in transport infrastructure will enable transformational economic growth.
Strategic Programme Outline Case	SPOC	Catch-all term to integrate the similar considerations that were to be taken forward as part of the SOP and SOC.
Strategic Road Studies		Northern Trans Pennine Routes; Manchester North-West Quadrant; Trans Pennine Tunnel
Sub-national Transport Body		A formal, legal entity designed to bridge the gap between national and local projects to plan and prioritise long term infrastructure investment in a specific region.
Transport Appraisal Guidance	WebTAG	An online tool which provides information on the role of transport modelling and appraisal, and how the transport appraisal process supports the development of investment decisions and business cases.
Transport for the North	TfN	The sub-national transport body for the North

Term	Acronym
Air Quality Management Areas	AQMAs
Appraisal Specification Report	ASR
Appraisal Summary Table	AST
Areas of Outstanding Natural Beauty	AONB
Association for the Advancement of Cost Engineering International	AACEI
Benefit Cost Ratio	BCR
Distributional Impact	DI
Exogenous Demand Growth Estimation	EDGE
Environmental Appraisal Report	EAR
Environmental Impact Assessment	EIA
Environmental Statement	ES
External Forecast Model	EFM
Full Business Case	FBC
Governance for Railway Investment Projects	GRIP
Great Britain Freight Model	GBFM
Gross Domestic Product	GDP
High Speed 2	HS2
HM Treasury	HMT
Independent Economic Review	IER
Integrated Sustainability Appraisal	ISA

Term	Acronym
Local Enterprise Partnership	LEP
Major Road Network	MRN
Million passengers per annum	mppa
National Character Area	NCA
National Nature Reserve	NNR
National Trip End Model	NTEM
Net Present Value	NPV
North of England Rail Model System	NoRMS
Northern Powerhouse Rail	NPR
Northern Transport Demand Model	NTDM
Official Journal of European Union	OJEU
Option Assessment Report	OAR
Outline Business Case	OBC
Post Opening Project Evaluation	POPE
Present Value	PV
Present Value of Benefits	PVB
Present Value of Costs	PVC
Project Control Framework	PCF
Public Transport	PT
Regional Transport Model	RTM
Sites of Special Scientific Interest	SSSI
Senior Modelling Group	SMG
Small to Medium Enterprise	SME
Special Areas of Conservation	SAC
Special Protection Area	SPA
Stage Gate Assessment Review	SGAR
Stakeholder Engagement Plan	SEP
Strategic Outline Business Case	SOBC / SOC
Strategic Outline Programme	SOP
Strategic Road Network	SRN
Strategic Transport Plan	STP
Trans-Pennine South	TPS
Technical Assurance Group	TAG
Transport Economic Efficiency	TEE
Value for Money	VfM
Value of Time	VoT
Variable Demand Model	VDM
Wider Economic Benefits	WEBs