Connecting the Energy Coasts: 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

1 Introduction

Background

1.1 The people of the North are at the heart of Transport for the North's (TfN's) Strategic Transport Plan (STP)[1]. 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)[2] 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[3], which form part of the reference case for this study. This study specifically seeks to explore the Connecting the Energy Coasts Strategic Development Corridor (SDC).

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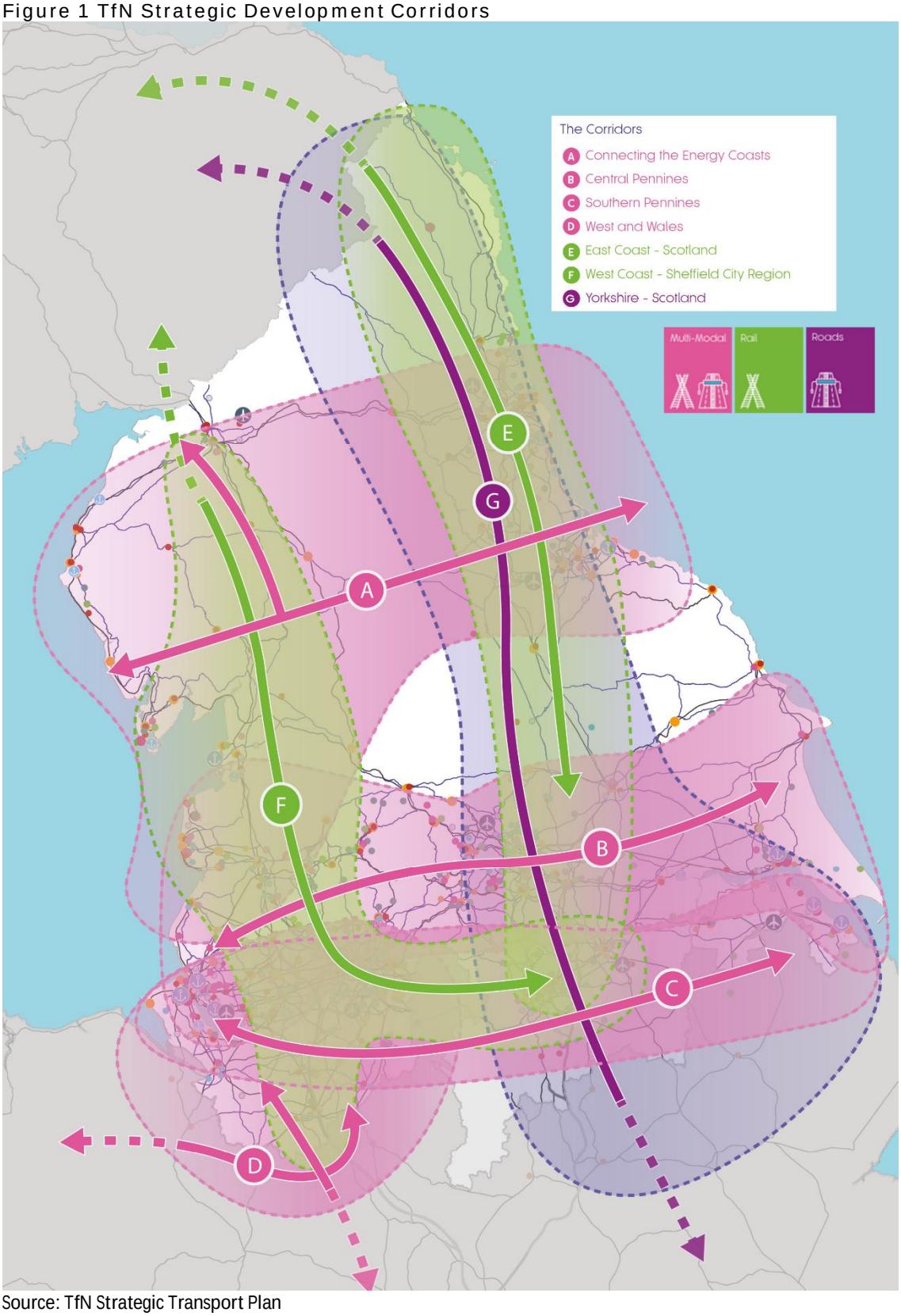
[1] Transport for the North, *Strategic Transport Plan* (2018) https://transportforthenorth.com/wp-content/uploads/TfN-Strategic-Plan_draft_lr.pdf

[2] Transport for the North, *The Northern Powerhouse Independent Economic Review Final Executive Summary Report* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

[3] 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 (DfT)) 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[3]' 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 Connecting the Energy Coasts SDC

1.18 The Connecting the Energy Coasts corridor is an east-west corridor broadly extending from the west to east coasts, from Cumbria and North Lancashire through to the North East. It connects regionally important settlements such as Blackpool and Carlisle, to Middlesbrough and Newcastle upon Tyne.

1.19 This corridor seeks to enhance the strategic connectivity, for people and goods, between the advanced manufacturing and energy generation research centres and assets. This is crucial to support the transformational growth potential within this economic area. There is a strong presence of the North's prime capabilities within this corridor.

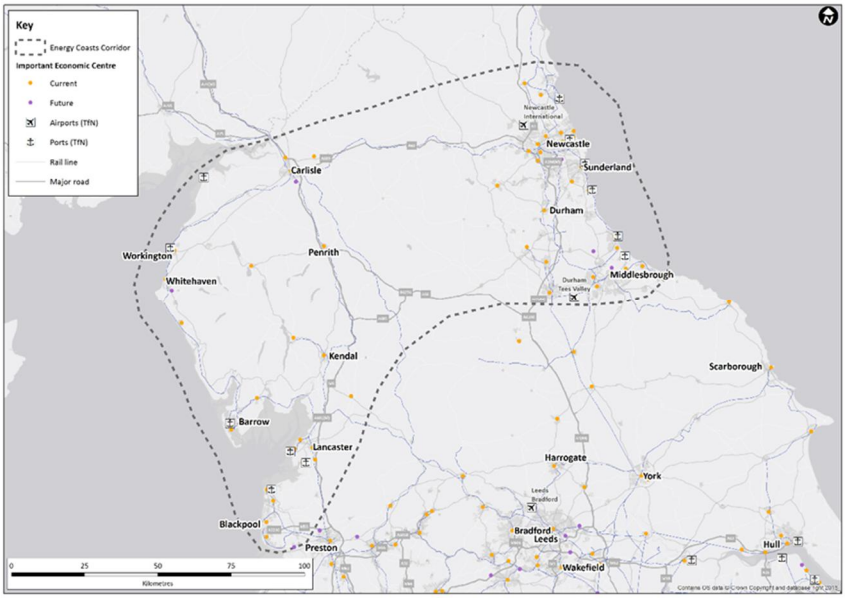
1.20 These economic centres and assets need to be better connected within the corridor, as well as to the north-south transport corridors. Strategic transport investment in this corridor will support nationally significant infrastructure investment, unlock opportunities for employment, support the supply chain, and support housing construction including a number of proposed garden villages, such as St Cuthberts Garden Village in Carlisle and Bailrigg in Lancaster. Enhanced connectivity will also support the Visitor Economy by improving access to tourism and leisure destinations which form part of the North's natural assets, such as the National Parks and emerging developments such as Eden of the North proposed for Morecambe.

1.21 To the west of the corridor, strategic connectivity improvements can support nationally significant infrastructure such as Heysham nuclear power station and land at Sellafield, which would build upon a centre of

[3] The three ongoing Strategic Road Studies, Northern Powerhouse Rail

international excellence in the nuclear sector in the North West. The ports at Barrow and Workington represent important assets and strengths in advanced manufacturing, including BAEin Barrow and renewable energy schemes in the south of Cumbria. To the east of the corridor, there is significant growth potential in the energy generation industries within the North East and Tees Valley, as well as in logistics at Port of Tees and Hartlepool, Port of Tyne, Port of Sunderland and the Port of Blyth. Additionally, there are growing capabilities in health innovation and the digital sector in the North East. Specialisation in manufacturing and production is a key asset in this corridor.

Figure 2 Connecting the Energy Coasts 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)[4], but greater than a Strategic Outline Programme (SOP). To distinguish them from these two documents defined in HM Treasury (HMT) and 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 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.

[4] 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

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[5] 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.

[5] HM Treasury, *The Green Book: appraisal and evaluation in central government* (2018) www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-govervent

Structure of SPOC

1.28 The TfN SPOCs have been developed with reference to the HMT Green Book6 and DfT 7 and HMT business case guidance[5]. 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 14
- 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

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[8] 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

[6] HM Treasury, *The Green Book: appraisal and evaluation in central government* (2018) www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

[7] Department for Transport, *The Transport Business Cases* (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf

[8] Department for Transport, *the Value for Money Framework* (2017) https://www.gov.uk/government/publications/dft-value-for-money-framework

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 Connecting the Energy Coasts 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[5] (HMT) and Department for Transport[7] (DfT) business case guidance. It has drawn on DfT Supplementary Strategic Case Guidance, with respect to its *Transport Investment Strategy*[9] and Rebalancing Toolkit[10].

[9] Department for Transport, *Strategic Case Supplementary Gudiance* (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669041/strategic-case-supplementary-guidance.pdf

[10] Department for Transport, *Strategic Case Supplementary Guidance – Rebalancing Toolkit* (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_ data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf

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 Connecting the Energy Coasts 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[11,12].

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.

[11] 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

[12] 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

2.8 DfT's *Transport Investment Strategy*[13] 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[14]. 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

[13] 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

[14] 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

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*[15] 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*[16] 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*[17] (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:

2.13 The STP identifies seven SDCs (based on the 2017 Integrated Rail and Major Roads Reports), including the Connecting the Energy Coasts 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.

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[15] Department for Transport, *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

[16] 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

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

Figure 4 TfN Key Pan-Northern Objectives

2.14 Through the Norther 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[18], 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

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

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[19] 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[20]. This toolkit is designed to help authors of strategic cases assess how a project fits with the objective of spreading growth across the whole country.

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

[20] Department for Transport, *Strategic Case Supplementary Guidance Rebalancing Toolkit* (2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/669043/supplementary-guidance-rebalancing-toolkit.pdf

2.20 The Northern Freight and Logistics Report[21] 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, a wide range of strategies and policies have been developed within the Connecting the Energy Coasts SDC 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 contributing towards a Northern Powerhouse. These are summarised as follows:

Table 2 Key policy themes

Geography	Key policy themes
Cumbria	· Investment in existing assets located within Cumbria which include advanced manufacturing growth, nuclear and energy excellence, vibrant rural and visitor economy and strategic connectivity to the M6. · Recognition that transport plays a vital role in everyday life and that existing infrastructure often experiences high levels of traffic and congestion during peak tourism seasons. · Recognition for the need to invest and encourage in all transport modes including travel by car, public transport (rail and bus) and walking and cycling, reflected within their policy objectives which encompasses all transport modes. · To encourage public transport use, smartcard technology has been highlighted to be adopted. To encourage walking and cycling to work and school a transport priority highlights the need maintain roads, paths and cycle ways. · A significant number of infrastructure improvements have been progressed and identified through the Northern Trans-Pennine Routes Strategic Study, West of M6 Strategic Connectivity Study and Cumbrian Coast Rail Upgrade Study. · Recognised needed to boost strategic links within the county and with other strategic centres in the north and Scotland. This is important in supporting investment, increasing access to markets. · Recognised need to strengthen road and rail access to support the growth and diversification visitor economy both

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

	domestically and international. This includes enhancing links to international gateways and in providing onward connectivity from stations · The dispersed geography of Cumbria necessitates steps to increase the reach of travel to work areas. This is important in increasing opportunities for people but also in supporting businesses and there access to the skills needed to support growth" · Cumbria will host a pipeline of major investments. Supporting the delivery and operation of these it will critical to deliver increased capacity on the road and rail networks.
The Borderlands (covering five local authority areas on the England Scotland border (Scottish Borders, Northumberland, Dumfries and Galloway, Carlisle and Cumbria)	· Proposition has been developed to tackle the economic challenges faced in the area, cited as the need for population growth and improved productivity, within the context of the emerging economy. · Recognition that agility is key, focusing on the factors which increasingly make places attractive to investors, visitors and those who wish to relocate. · Proposition aims to deliver transformative change and maximise economic benefits and identifies where market intervention is required to achieve this. · Proposals include a range of transport priorities for this area including upgrading of road networks including the A69 and A595, rail networks including the Tyne Valley Rail Line and improved capacity, journey times and connectivity to the West Coast Main Line (WCML) and East Coast Main Line (ECML) and ensure connectivity to HS2 services is maximised.
North East (including the North of Tyne CA (NTCA) covering Newcastle, North Tyneside and Northumberland, and the North East CA (NECA) covering County Durham, Gateshead, South Tyneside and Sunderland. The area also represented by the North East LEP	· North East - In the North East there are two combined authorities. The North of Tyne CA (NTCA) covers Newcastle, North Tyneside and Northumberland, and the North East CA (NECA) covers County Durham, Gateshead, South Tyneside and Sunderland. Strategic Transport is delivered across all seven authorities through a Joint Transport Committee, supported by a Regional Transport Team. The North East Local Enterprise Partnership covers the entire geography of the region with a target of delivering 100,000 extra jobs in the region of which 60% are better jobs. One of the key elements in the achievement of this target is to ensure the region is better connected intra regionally, across the north, country and beyond. · In 2016, the North East released a Transport Manifesto this has the aim of providing affordable, attractive, reliable, safe, healthy transport choices for businesses, residents and visitors while enhancing the environment. Work is ongoing on the preparation of a North East Transport Plan. This will be supported by supplementary strategies, covering the bus, metro, local rail, cycling and walking

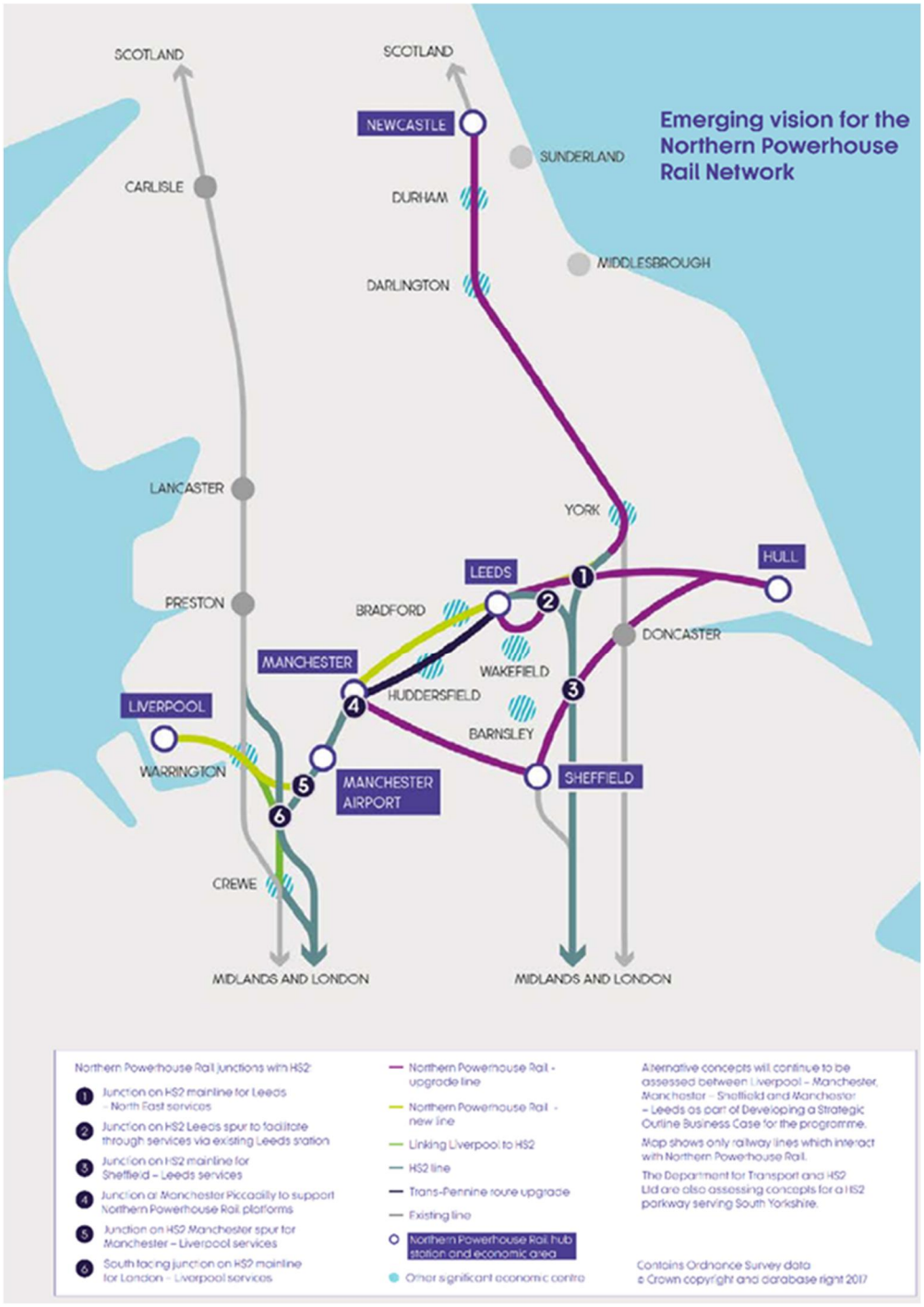
	networks. With regard to Roads the region has a defined key Road Network (KRN) and has worked with DfT and TfN to define a Major Road network (MRN). The region works in close partnership with Highways England to deliver improvements to the Strategic Road Network, including major improvements on the A1, A19, A69 and A66 to improve journey time reliability and address congestion. The regions 5 ports and Newcastle International Airport are significant assets for international passenger and freight access to the region and contribute significantly to the economy of country. · County Durham and Northumberland fulfil responsibilities for public transport in their areas and Nexus fulfils this role on behalf of the 5 Tyne and Wear Authorities. The region benefits from a Tyne and Wear Metro system, owned and operated by Nexus, this system which integrates towns and cities across Tyne and Wear is part of the fabric of the region and is critical for connecting people to jobs, transport assets, education, healthcare and leisure opportunities. The region's bus network is one of the largest in the country and not dissimilar to other regions is suffering from declining patronage. Local Authorities are working cooperatively with the industry to examine these trends and work to find solutions. The local rail network in the region is relatively self contained rail system with the potential to integrate more closely. Covering the North East and Tees Valley the region benefits from a North East Rail Management Unit which exists to deliver meaningful local influence over the delivery of rail services within North East England and to develop rail services to facilitate and stimulate economic growth and which support the social cohesion of the North East; delivering improvements to capacity, journey times, passenger comfort and reliability of performance. National and pan Northern links are available on the East Coast, Durham, Coast, Tyne Valley and Bishop lines. The North East is developing an improved way of working with Network Rail and TfN through a shared commitment to deliver rail improvements. The East Coast Main Line (ECML), it is our key item of rail infrastructure and our main transport artery. However, journey times and capacity do not match our aspirations, improvements to this line to deliver High Speed connectivity and reliance is the subject of this study but is nevertheless of interest. · The region does have challenges around air quality and congestion, most pronounced in its urban areas. Three authorities are required to submit plans showing how they will reduce these No2 exceedances. Interventions in this strategy are cognisant of the challenges facing the environment. The regions' Go Ultra Low North East project will see a step change in the level of EV infrastructure

	within the region, including a dedicated EV filling station, making it far easier to own an EV. · There is however much more work to do and this study seeks to identify improvements that could be delivered. This report considers multimodal connectivity improvements in the region which would serve to better connect the region to our neighbours, and deliver greater levels of pan northern, national and international connectivity.
Tees Valley	· The economic geography and peripheral nature of the area acts as a constraint. There are a number of centres within a very small area, as opposed to one dominant economic/commercial centre. This means that interconnectivity is vital in order to function effectively. This presents future challenges, as rising private car usage is likely to put additional strain on the transport network, making routes such as the A19 less resilient. · Transport policies for both the Tees Valley target walking and cycling particularly in the more urban areas and there is also recognition of road safety as a key priority particularly if it is to encourage walking and cycling.
Lancashire	· LTP includes policy to 'secure a strong economic future by making transport and travel into and between our major economic centres more effective and efficient and by improving link into neighbouring major economic areas and beyond'. The implications of which is the potential for improved transport links from Lancashire into the Energy Coast.

The Reference Case

2.22 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-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

2.23 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.

2.24 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 3 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	

For a full list of interventions covered by the reference case for the Connecting the Energy Coasts SDC, see Table 4.

2.25 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.

Table 4 Reference Case: List of interventions (Road/Rail)

Road	Rail
· A595 Carlisle Southern Link Road · A595 Capacity Upgrade between Mealsgate and Moota (Bothel / Moota) · A595 / Homewood Road Junction Improvements · A595 / Pelican Garage / New Road Junction Improvement · A595 Beckermet Junction and Moorside / Sellafield Junction Improvements · A595 / Inkerman Terrace Junction Improvements · A595/A66 Fitz and Great Clifton Junction Improvements – 77 & 76 · A66 Brigham Broughton Junction Improvement · Whitehaven Relief Road · A595 Grizebeck Improvements · Cross-a-Moor Junction Improvement · New link between A591 and A6 to the north of Kendal · New Ribble Road Crossing to link Preston and South Ribble · A585 Windy Harbour – Skippool · Yeadon Way Access Route Upgrade · Preston Western Distributor and new M55 J2 · M55 J4 Heyhouses Link Road · M6 Junction 33 Improvements · A69 junction improvements at Corbridge and Hexham · A66/A6 Junction Upgrade · A66 Dualling · Port of Workington Access Bridge · A185/A194/A19 Traffic Movements (The Arches Junction) · A1 Leeming to Barton improvement · Expansion of Tyne and Wear's Urban Traffic Management and Control (UTMC) Services · A1 Birtley to Coal House · A1 Scotswood to North Brunton · A1 North of Ellingham · A1 Morpeth to Ellingham Dualling · A19/A1058 Coast Road junction improvement · A19 Testos and Downhill Lane junction improvements · A19/A194 and A19/A185 Lane gain/drop arrangement · A19 Moor Farm Junction Improvements · A19/A182 Junction Improvements · Blyth Relief Road; Northern Gateway - Two Way Traffic Dame Dorothy Street · Sunderland Strategic Transport Corridor, Stage 3 - New Wear Crossing to St Mary's Roundabout · Durham Relief Road. · Darlington Growth and Enterprise Zone Connectivity · Cargo Fleet Roundabout Capacity Improvements · A1(M)/ J59 Junction Capacity Improvements · A171 Swans Corner to Flatts Lane Improvement · A19 Norton to Wynyard · A66 Darlington Northern Link Road · New Tees Crossing: Newport Option and Viaduct Option	· Energy Coast Rail Upgrade · Manchester - Preston Improvements · Northern rail franchise service enhancements · HS2 Phase 2b · East Coast Main Line power supply upgrade · Horden Peterlee station · HS2 Phases 1, 2a and 2b including all necessary station works to accommodate services; Northern Powerhouse Rail programme; North West Electrification programme; Committed service frequency and rolling stock enhancements via Franchises

Structure of Strategic Dimension

2.26 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 Connecting the Energy Coasts 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[22]; 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.

Connecting the Energy Coasts SDC's contribution to the North's Economy

3.8 The economy of the Connecting the Energy Coasts SDC, covers a broad east-west stretch of the North of England, from the North East coastal conurbation to the east, across to Cumbria and north Lancashire to the west. The area varies significantly from the urban conurbations clustered along the North East and Lancashire coasts and the rural economies that broadly separate them. It is home to approximately 4 million people, accommodating 1.9 million jobs which generate £72 million in GVA.

3.9 The key population centres are located along the north east coast and the Tees Valley. To the west these include Carlisle and Barrow in Cumbria, as well as, the Lancashire coastal towns of Morecambe and Blackpool.

3.10 The Connecting the Energy Coasts SDC links a cluster of advanced manufacturing and energy generation facilities located in the North East, Tees Valley, Lancashire and Cumbria and also North Yorkshire. The study

[22] Prime and enabling capabilitieswere 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 andProfessional Services, Logistics, and Education (primarily Higher Education)

area contains a large swathe of rural land between the M6 and A1(M)/A19 in Cumbria, County Durham and North Yorkshire.

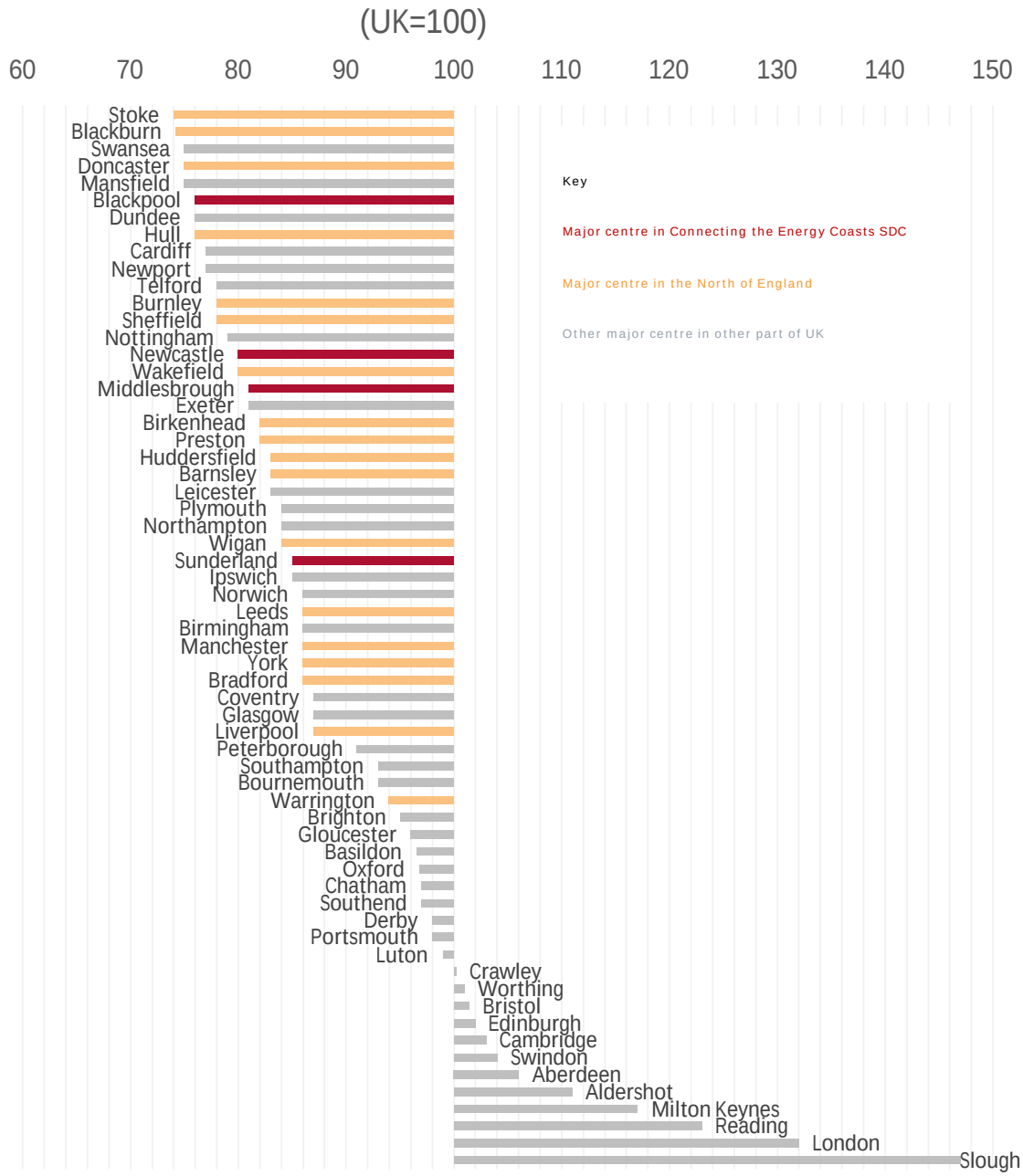
3.11 The main rail hubs for the north east are Newcastle and Darlington, which are the busier stations in the North of England. The WCML runs through the west of the corridor, and is crucial in connecting Scotland to Manchester and London. There are major north-south road routes both in the west and east of the region, as well as the key road, rail route connecting Carlisle and Newcastle. Carlisle is an important rail hub on the WCML. Similarly Penrith and Oxenholme have seen strong growth over recent years and are key gateways to Penrith, Oxenholme and the Lake District National Park.

3.12 The A66 provides an important east-west connection. The A590 and A595 provide strategic connectivity between the M6 corridor and the major centres in west and south Cumbria.

GVA – The Performance Gap

3.13 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 five of those which are under-performing are located in the Connecting the Energy Coasts SDC.

Figure 6 Relative productivity of major centres within the Connecting the Energy Coasts SDC, North of England and other parts of the UK (GVA per head index 2015)[23]



Employment Rate – The Employment and Skills Gap

3.14 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

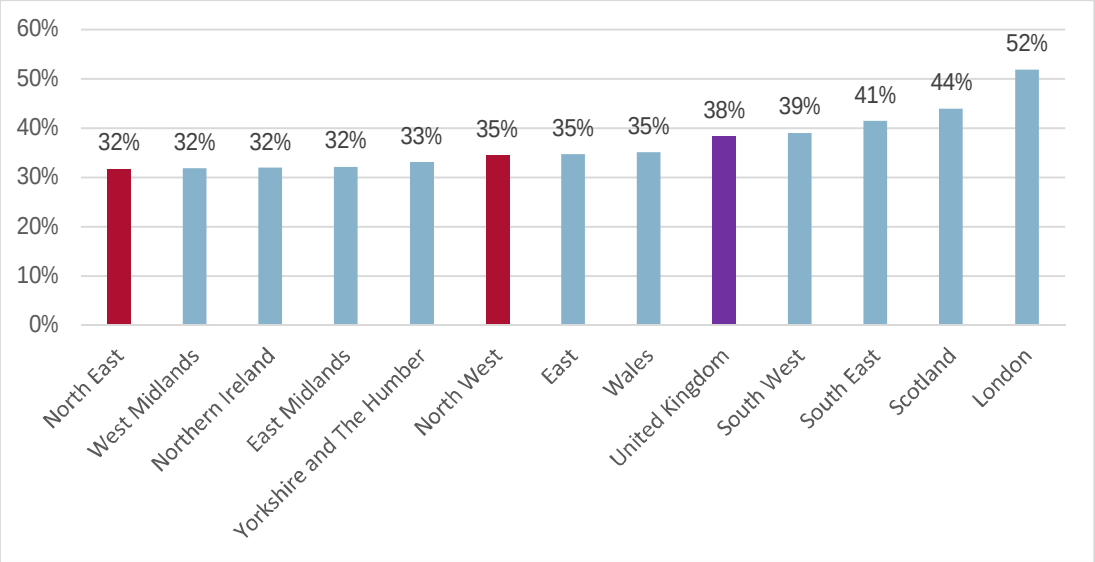
[23] Source: Author's analysis of Centre for Cities, the role of place in the UK's productivity performance, 2-17, productivity performance based on 2015 ONS data (GVA per head index) Connecting the Energy Coast cities highlighted in red and other North of England cities highlighted in orange.

behind, with the former industrial powerhouses of the North among the 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.

3.15 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[24], 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.

3.16 This is reflected in the proportion of working age population with high levels of qualifications, which is below the UK average in North East and 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[25].

Figure 7 Proportion of working age population with NVQA+ qualifications in 2017[26]



[24] Transport for the North, *The Northern Powerhouse Independent Economic Review Final Executive Summary Report* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

[25] Transport for the North, *The Northern Powerhouse Independent Economic Review Final Executive Summary Report* (2016) https://transportforthenorth.com/wp-content/uploads/Northern-Powerhouse-Independent-Economic-Review-Executive-Summary.pdf

[26] Office of National Statisitics, *Annual Population Survey* (December 2017 data)

3.17 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, 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 the North East) and attracting talent are key priority areas to encourage agglomeration, support the transfer of skills and goods across the corridor which will in turn improve the functioning of labour markets across the Connecting the Energy Coasts SDC.

Labour Productivity – Investing in NPIER capabilities

3.18 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 £46 billion 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 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.

3.19 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.

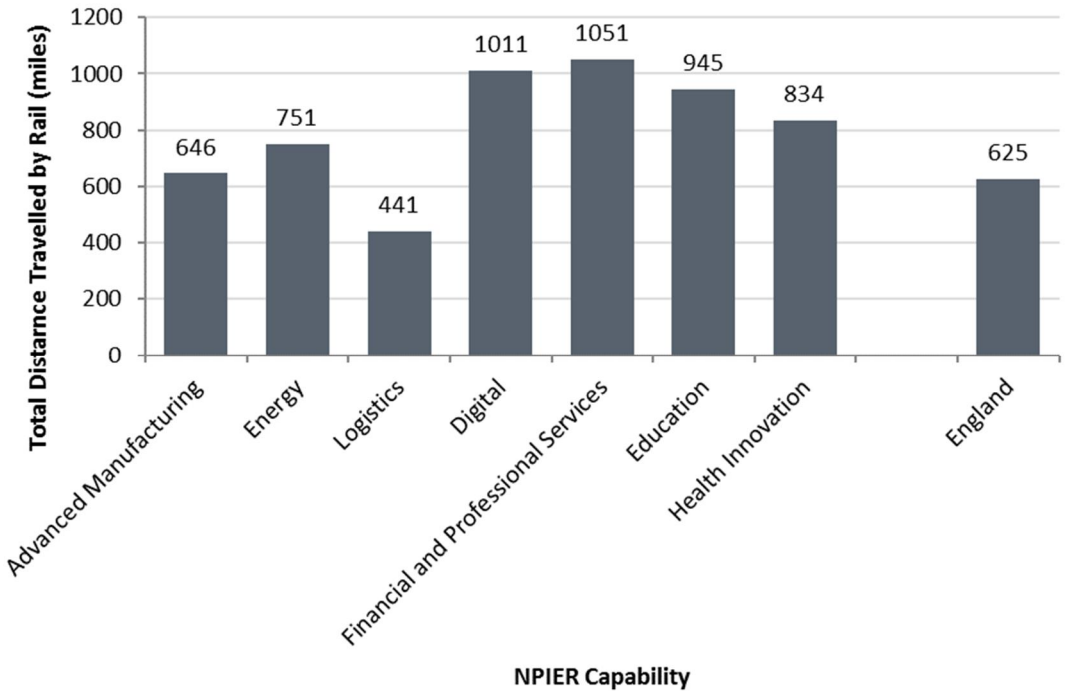
3.20 These are services or skills that provide the expertise and support for the North's economy to flourish, as well as significant generators of travel demand:

- 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 8 Weighted average total distance travelled by rail per person per year by NPIER Capability in England[27]



3.21 The four “Prime” capabilities and three “Enabling” capabilities, collectively represent approximately 30% of all jobs in the North and over 35% of GVA.

3.22 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

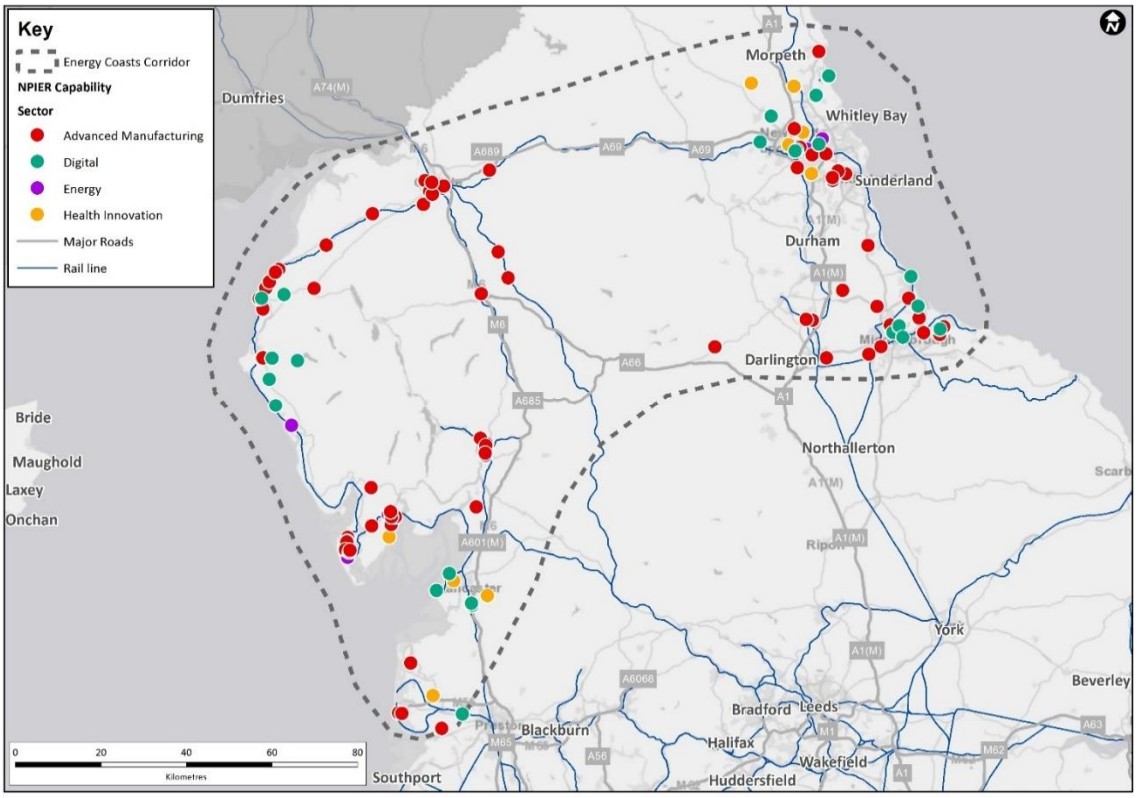
[27] Source: Analysis of National Travel Survey (2013) and Business Register and Employment Survey (2015) data

changes in both the travel patterns of individuals and aggregate patterns across the entire North.

3.23 The Connecting the Energy Coasts SDC 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.

3.24 As can be seen in Figure 9 Northern Powerhouse cluster industries are spread geographically across the Connecting the Energy Coasts SDC. Many of these are focussed along the east and west coasts. This highlights the need for connectivity to facilitate competition, collaboration and specialisation.

Figure 9 Location of Northern Powerhouse cluster industries in the Connecting the Energy Coasts SDC[28]



3.25 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.

[28] Source: Connecting the Energy Coasts Options Appraisal Report

Transport's influence on economic growth

3.26 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 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.

3.27 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

3.28 Overall, the impacts of transport are wide-ranging and can be grouped into three types: user benefits, productivity, and investment and employment impacts[29]. A logic chain showing how investment in transport infrastructure could flow through to wider economic impacts in the North is shown as Figure 10.

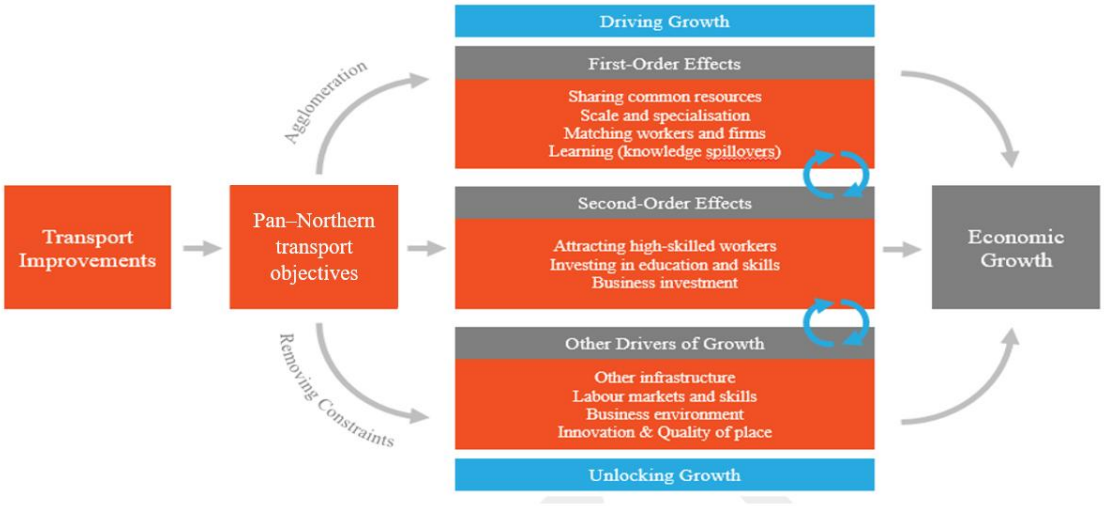
3.29 Investment in transport benefits both rail passengers and all road users as well as industry. The forecast growth within the NPIER shows an increase in road and rail usage. This also links to the road and rail freight moved within and out of the North. The key increases in freight flows are currently 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.

3.30 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

[29] 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

economic centres across the North closer together, creating the agglomeration benefits of a much larger, single economy.

Figure 10 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.

3.31 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

3.32 Across the Connecting the Energy Coasts 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 SDC corridor. These are discussed further below.

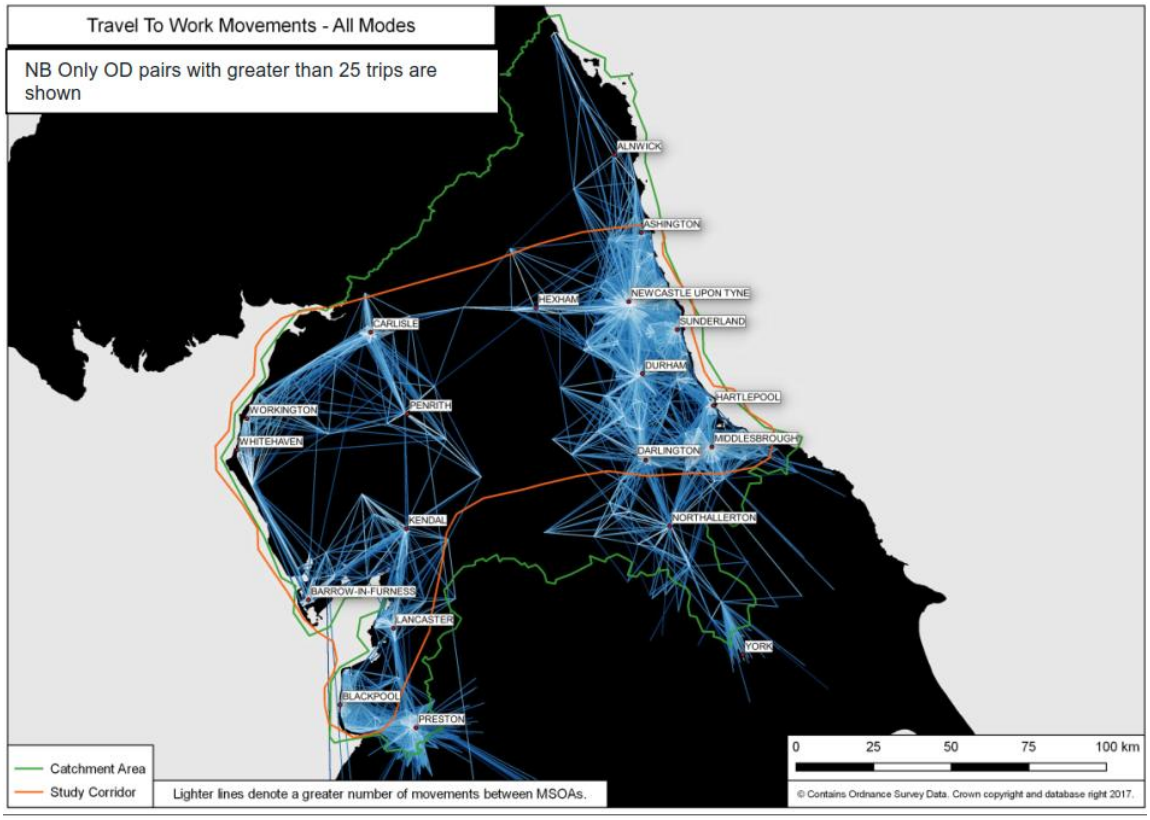
Travel Demand and Interaction

3.33 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. The North in particular suffers from limited regional connectivity preventing the region from becoming a single functional economic area and from reaching its economic potential.

3.34 Across the study area 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 from improved efficiencies.

3.35 Current travel patterns indicate a significant disconnect between the SDC'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 11 demonstrates this based on travel to work data for the Corridor and its travel to work catchment area.

Figure 11 Travel to Work movements - All modes (2011 Census Data)



3.36 It is the limited infrastructure and poor resilience which are regarded as key barriers to east-west connectivity as such agglomeration and employment opportunities can be limited and suppressed

3.37 The North of England's mixed-use, predominantly two-track railway presents capacity limitations which require trade-offs to be made between 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.

3.38 Even for major and relatively well-connected cities, the population catchment within an hour 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.

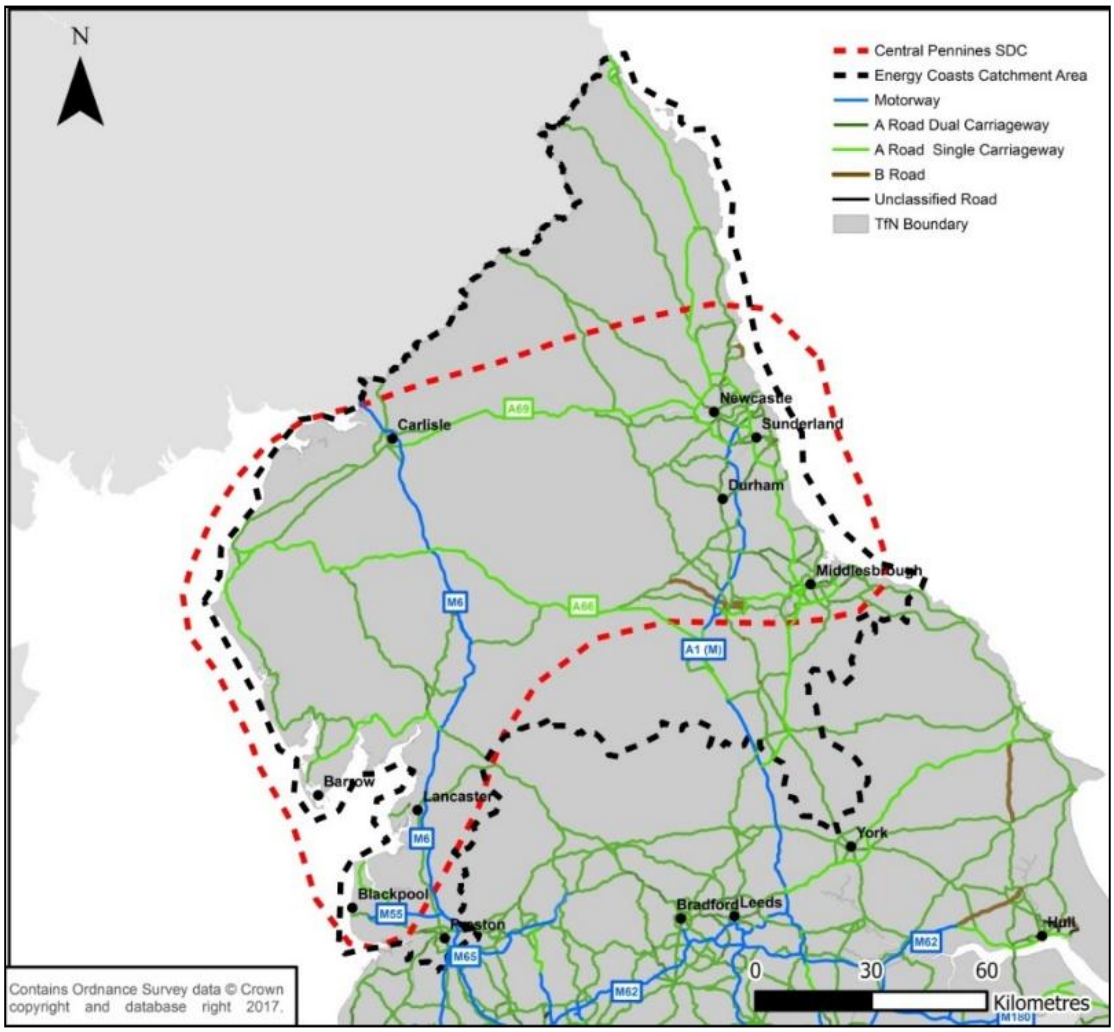
3.39 A programme of transport infrastructure investment across the North is currently being developed with the aim of transforming connectivity across the SDC – these are principally focussed on the North's major centres. Building on this platform, further intervention is required to ensure the

connectivity improvements provided by the reference case are enhanced and distributed spatially.

Major Road Network

3.40 The MRN in the context of the study area is shown in Figure 12. At the centre of TfN's vision is a resilient MRN providing improved and more reliable journey times linked to local roads and the Important Economic Centres to support the achievement of Transformational growth.

Figure 12 Major Road Network in the Connecting the Energy Coasts SDC



3.41 The M62 is the only continuous east-west dual carriageway road across the North, carrying half of all Trans-Pennine traffic, with other Trans-Pennine routes having comparatively lower flows. The M62 is outside of the Connecting the Energy Coasts SDC but nevertheless serves an important role. The A66 and A69 are important east-west routes within the study area as described in the following text.

3.42 The road network in the study area suffers from a number of connectivity challenges, including network resilience due to the low density of roads serving a relatively sparse population. Events and closures can have severe journey time impacts due to the lack of alternative routes.

3.43 In higher and coastal areas reliability is often impacted by adverse weather. Areas in the north of the corridor also experience instances of low-lying snow. The A66 Trans-Pennine Route from Scotch Corner to Penrith (with links to Teesport and Workington) extends to a height of 426m above sea level and is a mix of dual carriageway and single carriageway. The A66 is particularly vulnerable to closure during adverse weather conditions (snow and wind). The A591 section of the MRN between Keswick and Grasmere closed for five months following Storm Desmond in December 2015. The impact of adverse weather events on the network results in poor journey time reliability and increase the likelihood of road traffic collisions affecting the resilience of the network.

3.44 The all-weather route (A69) between Newcastle and Carlisle has a high proportion of single carriageway sections. It is more resilient to winter conditions than the A66(T) and is infrequently closed due to weather events.

3.45 The majority of committed investment in the SDC is to enhance connectivity across the North East, linking with the A1 and A19. There is also investment coming forward within the North West, between Heysham and the M6 Link Road and A69 junction improvements at Corbridge and Hexham.

3.46 There have been many schemes outlined as future developments within existing reports, much of which has focused on north-south connectivity. This has identified key gaps on an east-west basis, where the main strategic routes are the A69 and the A66 which connect Cumbria and Lancashire to the North East and Tees Valley.

3.47 The Highways England Roads Investment Strategy (RIS11) (2015-2020) focussed primarily on improvements to north-south connectivity (e.g. A1/ A19 improvements). The development of RIS2 (2020-2025) has utilised the key findings from the North Trans-Pennine Strategic Routes Study. This recommended the completion of dualling of the A66(T) between Penrith and Scotch Corner as well targeted local improvements on the A69(T). 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

3.48 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.

3.49 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.

3.50 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.

3.51 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.

3.52 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.

3.53 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.

3.54 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.

3.55 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.

3.56 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.

3.57 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.

3.58 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.

3.59 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.

3.60 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.

3.61 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.

Connecting the Energy Coast SDC

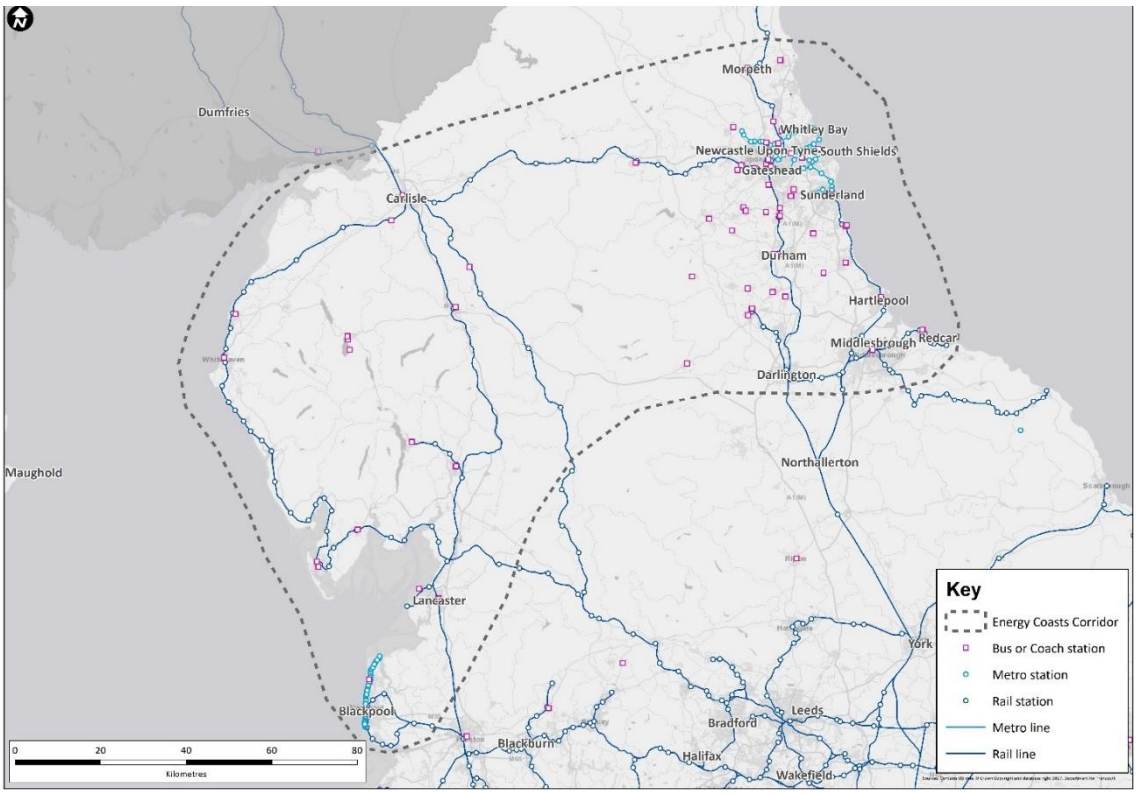
3.62 Public transport infrastructure in the Connecting the Energy Coasts SDC is shown in Figure 13. The public transport issues and opportunities considered in this report focus on rail, however long-distance commercial

coach operators also provide connectivity across the study area. Although coach journey times are often significantly longer than the rail equivalent, they can provide passengers with cost savings in terms of fares paid, and direct connections to destinations not served by the rail network.

3.63 Additionally, most end-to-end journeys involving a rail 'leg' will require travel via at least one different mode for access and/or egress. The wider public transport networks are vital in providing access to the rail network, particularly for those without access to private cars. Due to limited highway improvements currently planned for the A69 between Carlisle and Newcastle, and no parallel rail route along the A66(T) corridor, the Tyne Valley line is an important east-west rail link. The predominant mode of local public transport connectivity in the study area is the bus network, however Newcastle and Blackpool are notable for their metro and tram systems respectively.

3.64 As elsewhere in the North, rail journey times and service frequencies vary considerably across the rail network in the Corridor. Certain journeys, particularly those operating via the ECML and WCML, 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 such as Middlesbrough and Tyne and Wear. The only east – west rail route in the study area is via the Tyne Valley line, which connects the WCML at Carlisle to the ECML at Newcastle via west Northumberland and east Cumbria.

Figure 13 Public transport infrastructure in the Connecting the Energy Coasts SDC



3.65 The network of routes in the North East and Tees Valley provide important connectivity between urban centres in each Combined Authority area. At the northern end of the Durham Coast route, the Tyne & Wear Metro operates in parallel with heavy rail services, providing a high frequency service between Sunderland and the wider Tyne & Wear area. However, this means the route is heavily utilised. In the Tees Valley, passenger services operate across the Darlington, Stockton, Middlesbrough and Redcar axis, with Middlesbrough station forming an important node connecting services from the Durham Coast, Esk Valley and Tees Valley corridors, as well as longer-distance services. The current layout of the station presents operational constraints.

3.66 Rail freight access to ports is critical, with Port of Tees and Hartlepool, the Port of Tyne and smaller ports at Barrow, Heysham, Workington, Seaham, Sunderland, Hartlepool and Blyth all accessible via the rail network.

3.67 To the west of the corridor, the Cumbrian Coast route links the WCML at Carnforth and Carlisle via communities along the west Cumbrian coastline. Infrastructure characteristics currently serve to limit journey times, connectivity and capacity along the corridor. Improvements to the Lakes Line are important to support the visitor economy including providing access international visitors via Manchester Airport.

3.68 A significant programme of rail investment is being delivered across the North of England, which will begin to address some of the current connectivity challenges within the study area. Investment is being delivered via two main initiatives; franchise commitments and infrastructure enhancements. The Northern and TransPennine Express franchises were re-let by DfT in 2016. The new Northern franchise will deliver connectivity and capacity improvements through enhancements to passenger services across the study area. A key feature of the investment secured through the franchises will be service enhancements which include uplifted frequencies.

3.69 Alongside the service enhancements, a group of 12 Northern routes, primarily serving the inter-urban market, will be rebranded as ‘Northern Connect’ by December 2019. The initiative will uplift quality standards further for several routes in the study area, including:

- Middlesbrough – Carlisle via Newcastle
- Blackpool – York via Bradford and Leeds
- Windermere/Barrow – Manchester Airport via Preston and Wigan
- Blackpool – Manchester Airport via Preston and Bolton

3.70 Whilst improvements to rolling stock and route enhancements will be delivered, rail infrastructure investment this region is limited.

Freight

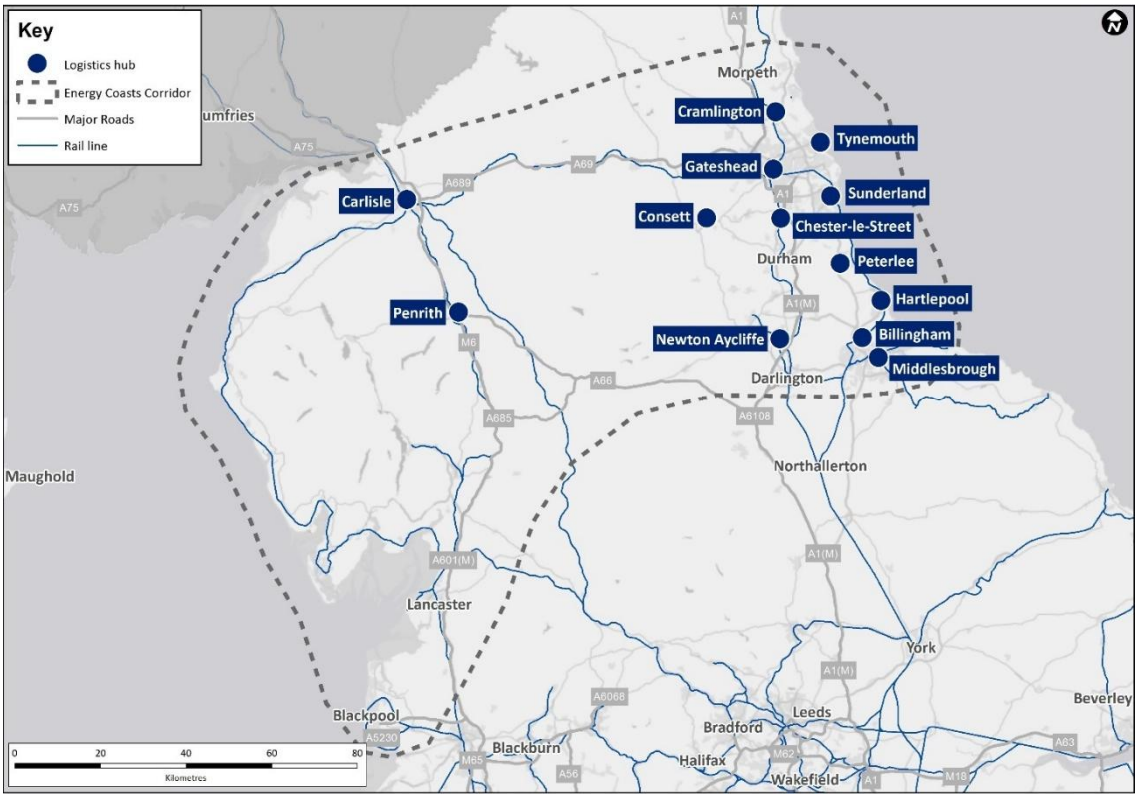
3.71 The freight market in the North is dominated by road with 87% of the tonne kilometres transported, rail accounting for 12% and waterway just 0.6%. This is compounded by the need to move large amounts of freight to airports in the South-East due to the lack of a large air freight market in the

North. There are no significant inland waterways within the Connecting the Energy Coasts SDC. Air freight is not significant in the region.

3.72 There are several key logistics centres within the corridor that can be found around the road network, often based on historical geographies, some of which have connections with ports and airports (such as Newcastle International Airport and associated pharmaceutical industry) while others have developed independently. A wide variety of commodities are moved around, to, from, within and through the corridor, in particular including fast-moving consumer goods (FMCG), construction and support for the energy supply chain. Whilst the ports are important, for road freight, domestic movements are by far the dominant activity for freight.

3.73 The North East and Tees Valley have seen significant take up of logistics and distribution space although this has not been on the same huge scale as the major established UK logistics parks in the Midlands, South East and North West. Logistics hubs in the Corridor are shown in Figure 14. There are no significant intermodal locations in the region, outside of the port infrastructure.

Figure 14 Logistics Hubs in the Connecting the Energy Coasts SDC



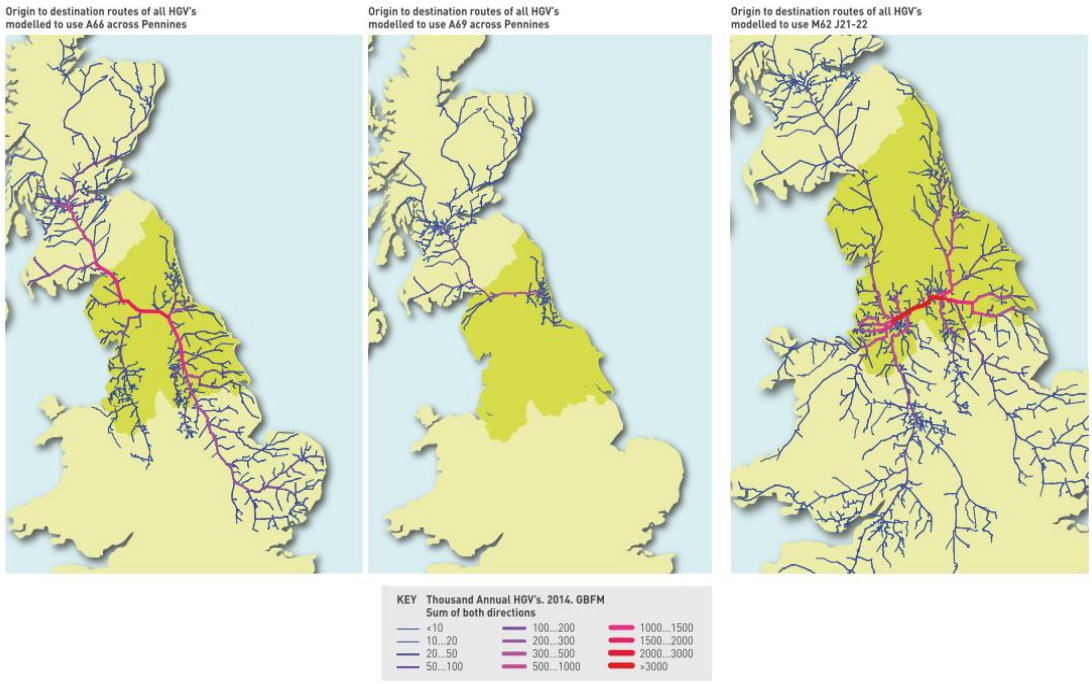
Road Freight

3.74 The most significant freight routes in the study area follow the M6, A1(M) and A66/A69 east-west corridors. However, as with all road traffic within this corridor there is a reliance on the M62 for freight movements. Freight vehicles travelling through the North by road are concentrated mainly on the M6 whilst the M62, which is within the neighbouring Central Pennines

corridor, is the only major motorway route across the Pennines. Other Trans-Pennine routes have comparatively low freight flows. This is demonstrated by MDS Transmodal analysis undertaken for TfN, shown in Figure 15.

3.75 Freight is especially vulnerable to resilience issues on the MRN as the primary users of the network and due to operational needs for timeliness of deliveries and the cost of delays. There is also a lack of resilience on routes north of the M62, such as the A66 and A69 discouraging these as alternative routes to the M6 and M62. Most freight routeing decisions are taken to provide the fastest route for an HGV between two points. The M62 is preferred because it is a fast route and it links pairs of origins and destinations with large demand. With improved road links across the A66 and improvements now in place on the A1(M) Leeming to Scotch Corner this route may see increased usage by HGVs.

Figure 15 Trans-Pennine Freight Movements (MDS Transmodal analysis for TfN)



3.76 It can be seen that freight travelling north-south through the SDC is concentrated on the west coast route via the M6 crossing the Pennines on the M62 (to the south of the corridor) or the A66, pushing more vehicles onto the M62 and the M6. The A69 is generally only utilised by freight with an origin or destination in the vicinity of Newcastle, and accommodates significantly lower freight volumes than the M62 and A66.

3.77 In 2016 the average length of haul for HGVs across the UK was 90km. 81% of HGV trips were less than 150km. This alone suggests that freight movements along the length of the corridor are likely to be less significant than those within the corridor. Similarly for ports, most ports serve a small hinterland – not least because the UK is an island with many competing ports. Bulk materials in particular, tend to be delivered within 50 km of the

ports, although there are exceptions. Food, drink, and manufactured goods move longer distances, using the network of distribution centres. However, imports and exports of these tend to be via the deep sea or roll on-roll off (RoRo) ports in the Eastern and South Eastern regions. Containers arriving into the North East ports are “feeder” operations – containers selected at major ports because they are destined for the North or Scotland. The Port of Tees and Hartlepool has significant RoRo flows as well as direct lift on-lift off (LoLo) services for example containerships serving the Baltic.

Rail Freight

3.78 The strategic rail network provides excellent north-south freight connections. The heaviest rail freight flows in the SDC are on the WCML and the ECML. There is some rail freight moved in the corridor between east-west from Newcastle to Carlisle. The Connecting the Energy Coasts SDC does not contain strategic rail freight interchanges or terminals however it contains major rail-connected ports on the Tyne, Tees and in Lancashire. In addition Barrow and Workington are also rail connected ports.

3.79 Historically, a large proportion of the Northern rail freight has been used to move coal between ports and inland power stations. With the reduction in coal use, this demand is decreasing as the UK switches to a lower carbon economy. However Redcar Bulk Terminal is still handling significant coal tonnages for the power stations and with the opening of the mine in West Cumbria this will bring 5-6 coal trains a day to Redcar.

3.80 The Tees Valley handles significant volumes of rail freight and has two quayside intermodal terminals. The Tees is the only port in the North with daily intermodal services (3 each day to Scotland and 1 each day to Felixstowe) and has full W12 clearance to the Midlands and the South. More announcements are expected in 2019 regarding additional routes. The Tyne also has an intermodal facility although no services currently exist.

Future demand for personal travel under a transformed North

3.81 Transformational economic growth in the North is be 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.

3.82 To reflect uncertainty regarding key factors affecting travel demand, Transport for the North 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.

3.83 Total demand for rail travel is expected to be up to 4 times higher than today. 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 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.

3.84 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 the 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.

Figure 16 Initial Northern Transport Demand Model Foresighting Scenarios

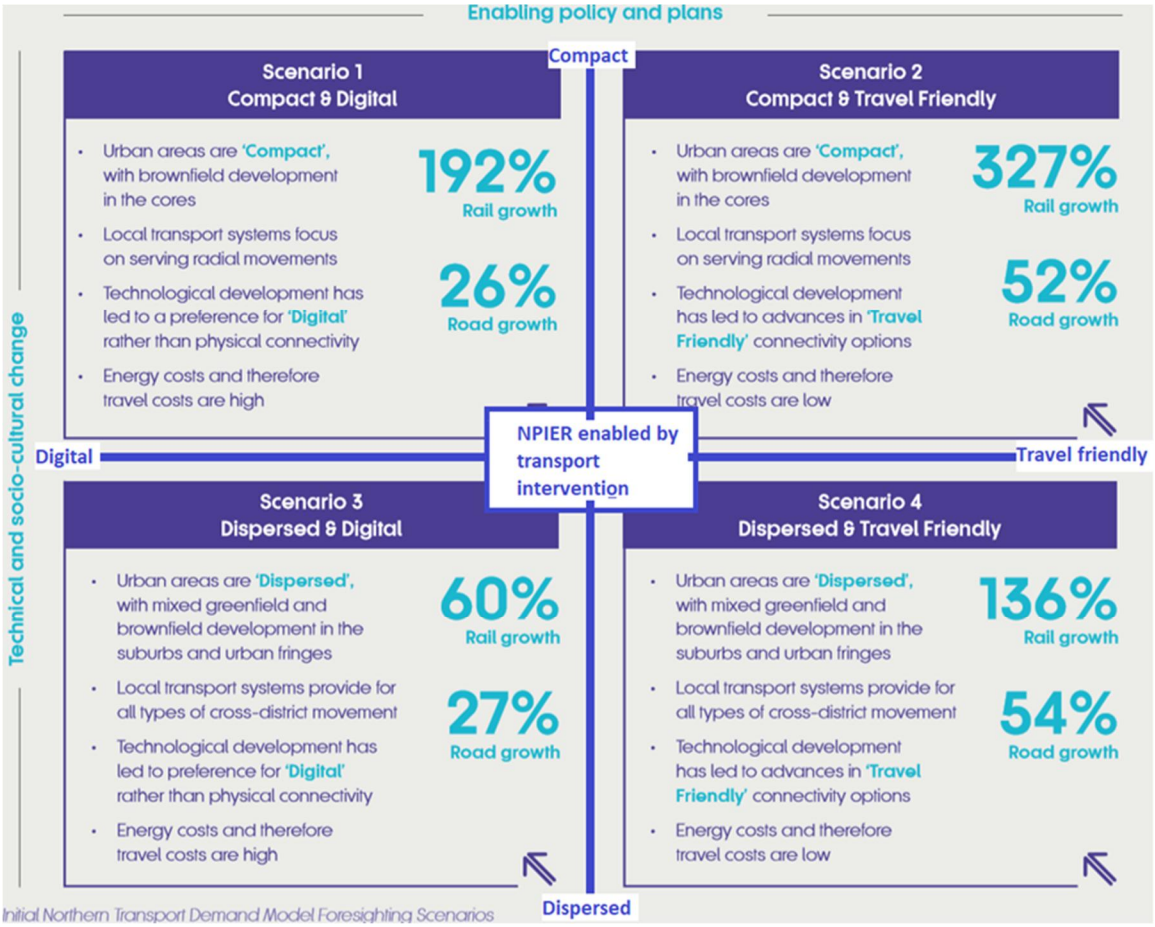
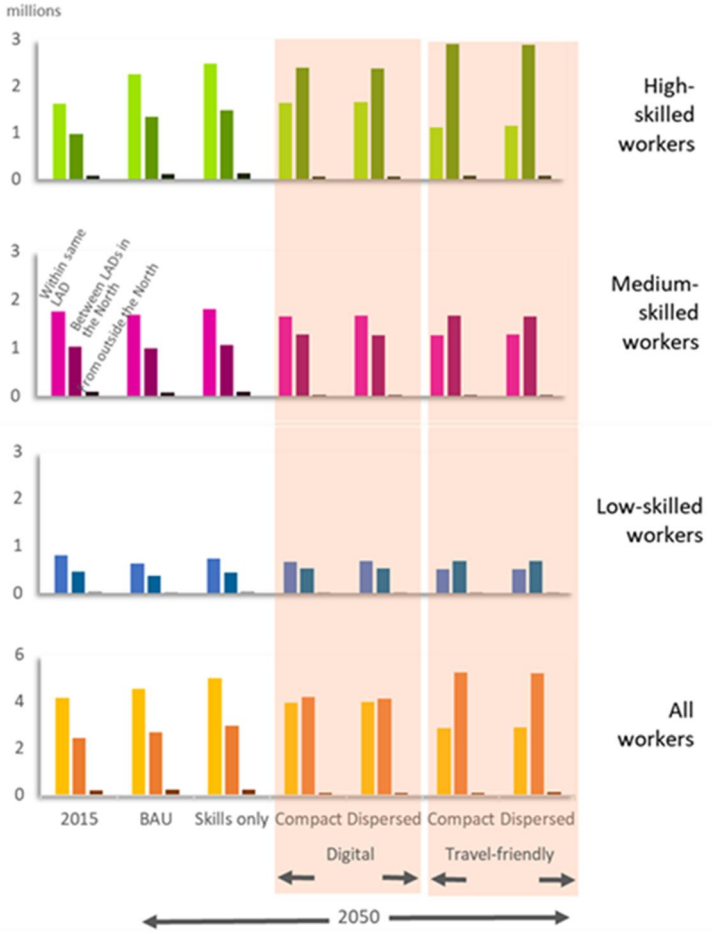


Figure 17 Commuting patterns under a transformed North



International Gateways

3.85 International Gateways in the Corridor include the Newcastle and Durham Tees Valley International Airports and the ports, especially Tees and Hartlepool, Tyne, and Sunderland. A significant contribution to GVA would be achieved if more international tourism, business trips and freight movements could be made directly to the region's ports and airports. Enhanced connectivity to global markets could also encourage inward investment.

Airports

3.86 International connectivity and accessibility is important to support a dynamic Northern economy. Overall, some 39.6 million air passengers were carried on flights to/from the North's airports in 2016, around 15% of the UK total. The largest proportion of air passengers consists of outbound leisure trips, which contributed around £0.5 billion to GVA in 2016. Considering business-related air trips specifically, 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.

3.87 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.

3.88 The Connecting the Energy Coasts SDC has a modest international air passenger and freight market, with airports outside of the corridor providing additional international connectivity. Newcastle is the only airport of significant size within the corridor and is the 11th largest in the UK for international travel. The airport currently handles 5.6 million international passengers per year (2018), with significant growth planned to 8.5 million passengers by 2030[30]. This is supported by a new masterplan with improved public transport connectivity as a key requirement. However, it is substantially smaller than the region's main hub at Manchester. Durham Tees Valley is the only other commercial airport in the corridor and presently makes a limited contribution to international travel. Long haul routes, outside of Europe are limited from the North, potentially having a negative impact on business competitiveness.

3.89 The destinations served by these airports reflect their different sizes and the roles they play in serving the region. Newcastle has a strong route network for its size (in comparison to Leeds Bradford or Liverpool), which reflects its relatively isolated position, being about 160 kilometres from the nearest alternative significant airports (Leeds Bradford and Edinburgh). Connections from Newcastle Airport are shown in Figure 18 and the passenger catchment in Figure 19. Newcastle Airport attracts passengers primarily from regional centres on the east coast of the corridor, including Middlesbrough and Durham, but also further afield from Carlisle (to the west), Edinburgh and Aberdeen (north and outside of the corridor), and Leeds (south and outside of the corridor).

3.90 Compared to elsewhere in the North, the predicted air passenger growth in the Corridor is modest, with Newcastle passenger numbers increasing from 4 million to between 6 million and 7 million by 2050[31].

[30] Department for Transport, A*irports Commission: airport level passenger forecasts 2011 to 2050* (2014) https://www.gov.uk/government/publications/airports-commission-airport-level-passenger-forecasts-2011-to-2050

[31] Department for Transport, A*irports Commission: airport level passenger forecasts 2011 to 2050* (2014) https://www.gov.uk/government/publications/airports-commission-airport-level-passenger-forecasts-2011-to-2050

Figure 18 Newcastle Airport business and hub destination flights

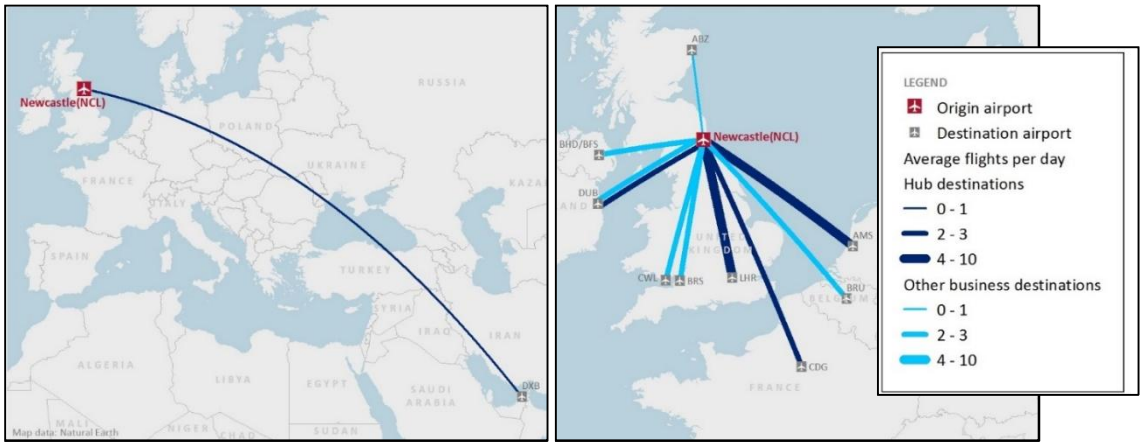
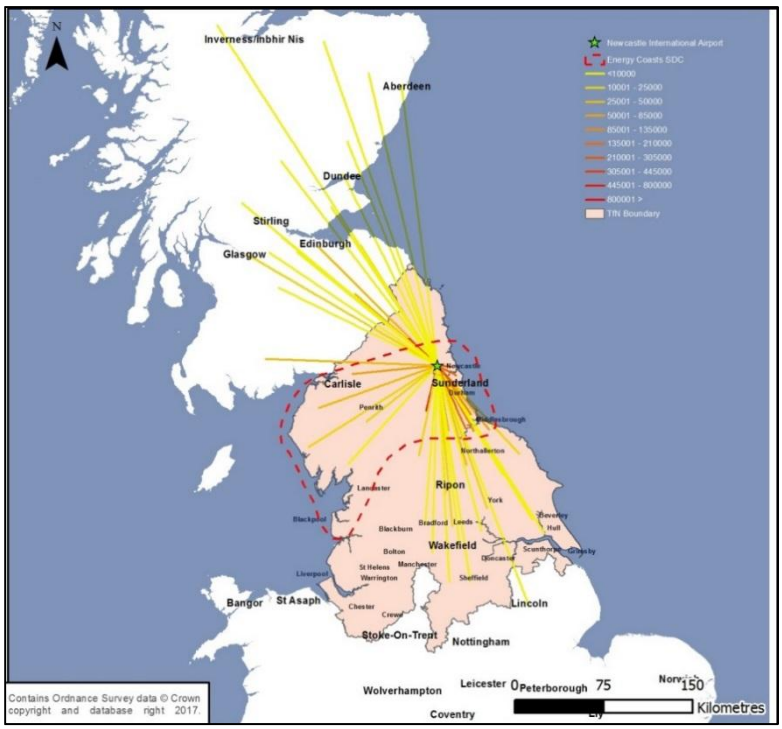


Figure 19 Newcastle Airport Passenger Catchment



3.91 In spring 2019 Carlisle Airport will begin commercial and business passenger flights for the first time since 1993, providing opportunity for improved connectivity by air to the SDC. The airport has seen significant investment and will increase provide increased connectivity and provide further options for travellers within the corridor.

Ports

3.92 The SDC has three large major ports, Tees/Hartlepool, Tyne and Sunderland, as well as a number of smaller/minor ports including Heysham. The Tees/Hartlepool facilities moved nearly 27,000 tonnes of freight in 2016, 6% of the UK total, whilst Tyne moved 1% (the EC SDC accounts for 7% of the UK total overall). Whilst the tonnages at Tees dropped by 11mt due to the collapse of SSI, in 2015, and Tyne tonnages have also seen a large decrease (as have Grimsby and Immingham) tonnages are already

recovering and will increase dramatically in the next 5 years due to the opening of the MGT power station (1mt), the opening of the Sirius polyhalite mine (Up to 10m tonnes a year) and the opening of the West Cumbria Mine (up to 2mt). Sunderland has also increased its tonnages significantly in the last 5 years. Hence as flows in some commodities have declined, the Ports have worked successfully to replace lost tonnages with new flows.

3.93 Consolidation of shipping lines into three large alliances, coupled with a geographical focus on the southern ports, due to their shorter connections to key mainland Europe ports, presents a significant challenge to the northern ports to attract business. However, greater trade with North America and the widening on the Panama Canal may put Liverpool into a stronger position to attract trade having a shorter Atlantic route than southern and eastern ports but this will have less impact on the ports within the Energy Coast SDC.

3.94 From a port perspective Tees/Hartlepool, Tyne, Workington, Heysham and Barrow all have a key role to play in significantly influencing freight flows on the land transport network. The east coast ports have a dominance in bulk commodities, and recent growth in containerised products outstrip growth at nearly (if not all) ports. For example the Port of Tees and Hartlepool has seen significant increases in container traffic averaging 6-7% per annum. The destination of these cargos mainly focus on short haul into the northern markets with some movement into Scotland. On the west coast the ports serve the offshore energy industries, dry bulk and RoRo traffic.

3.95 In many cases the decision on the port to use is self-selecting: oil or chemicals will unload at the refinery wharf. For building materials and timber, the market is very local. For components for Nissan, and finished vehicles, the Port of Tyne and Tees and Hartlepool Port are utilised. The west coast SDC ports serve a smaller local market.

3.96 The North has a relatively small international ferry and cruise passenger market, although these are growing. Though there is only one daily passenger ferry port in the corridor, on the Tyne, carrying 3% of the UK's short-sea passengers, flows have increased by 88% since 2000. There were over 50 cruise departures from the Tyne in 2018.[32]

Environment

3.97 Poor air quality impacts parts of the study area, particularly in and surrounding Tyneside and Teesside. Currently 29 Air Quality Management Areas (AQMAs) have been declared in the Corridor, These AQMAs are predominantly localised extents covering specific junctions or road sections, although AQMAs within Newcastle and Gateshead cover much of these city centres. Newcastle, Gateshead and North Tyneside have been directed to

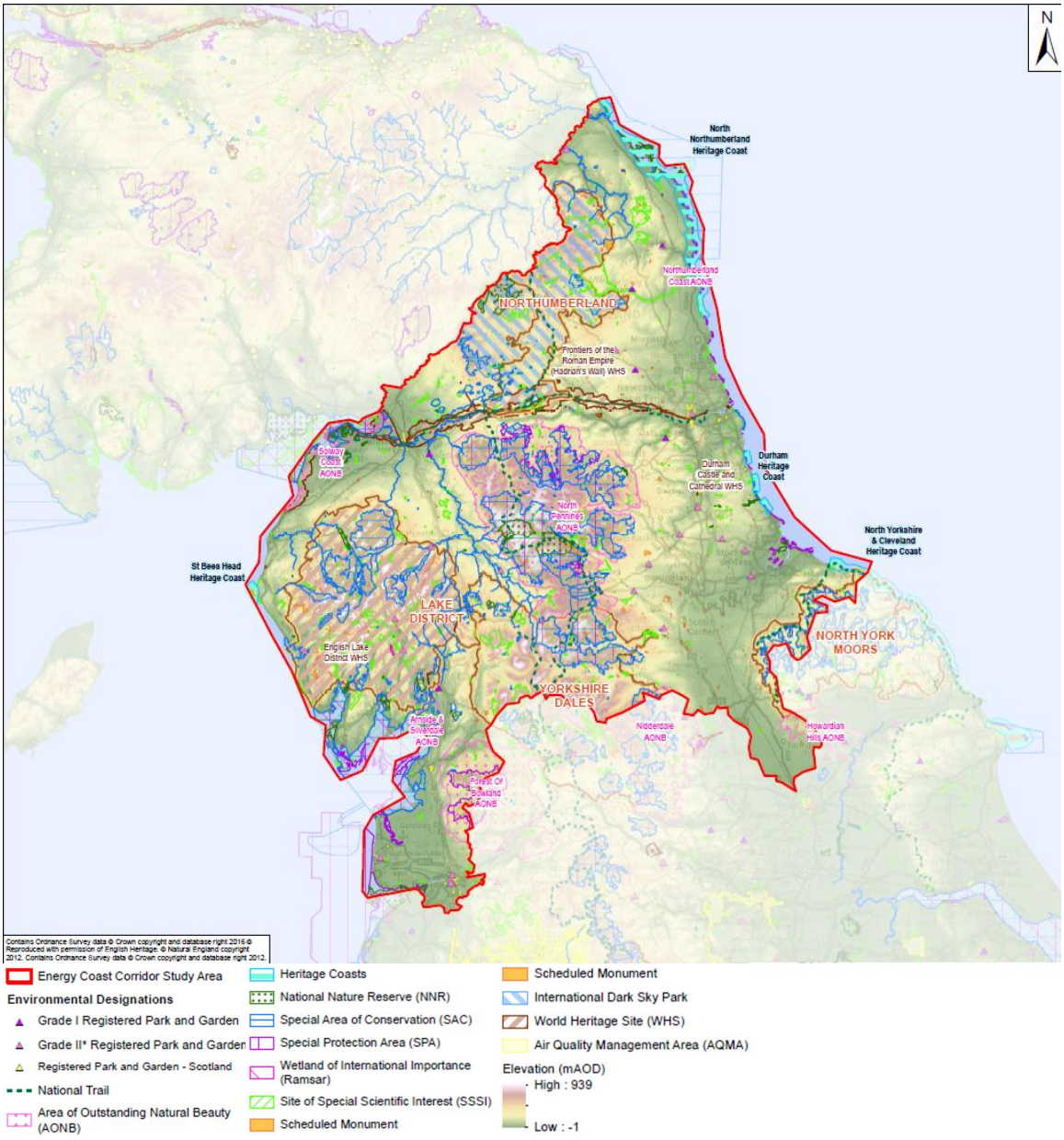
[32] Source: https://www.portoftyne.co.uk/storage/app/media/passenger-information/Port%20of%20Tyne%202018%20Cruise%20Schedule.pdf

reduce NO_2 levels through a Clean Air Plan in addition to designated AQMAs.

3.98 The transportation sector accounts for 24 percent of the UK's greenhouse gas emissions.

3.99 The natural landscape is a major positive attribute of the Energy Coasts Corridor, supporting quality of life and the visitor economy. The Energy Coast SDC includes 33 different National Character Areas (NCA). Designated high value landscapes within the Energy Coast SDC include the Lake District, Northumberland and a section of the Yorkshire Dales National Parks, Areas of Outstanding Natural Beauty (AONB) and Heritage Coasts. These are summarised in Figure 20.

Figure 20 Key environmental assets in the Connecting the Energy Coasts corridor study area



Future Technologies and Societal Change

3.100 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 private sectors are investing in and adopting a range of new technologies and will disrupt

current travel markets. In the North there is a strong base in vehicle manufacture including energy systems and research and development set within a framework to explore and shape innovation and importantly test and adopt. Within the Connecting the Energy Coasts SDC NECA, NTCA, Nexus and Newcastle University are working to assess the potential for disruptive technologies to supplement or replace existing local public transport links. However, the scale and timing of transformational change is at present unclear.

3.101 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.

3.102 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.

3.103 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 SDC should consider the potential to contribute to the 'digital backbone'.

3.104 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.

3.105 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.

3.106 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

3.107 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.

3.108 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.

3.109 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 Connecting the Energy Coasts SDC.

Connecting People: Accessibility for Residents of the Connecting the Energy Coasts SDC

3.110 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 and other personal business. Better transport links make jobs more accessible, provide greater choice and can deliver a better quality of life.

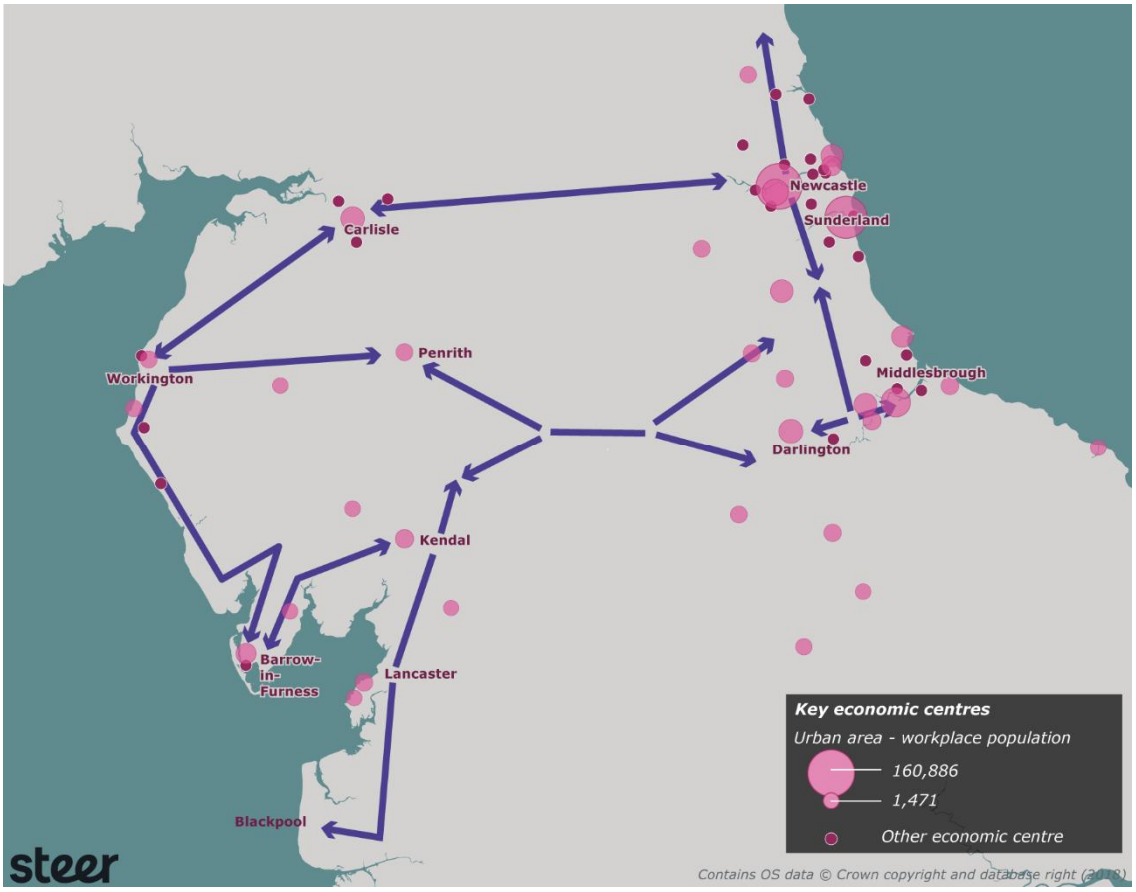
3.111 This will support the North's deprived areas in reaching their full economic potential. For an employee seeking work, better links increase the number and range of jobs and career opportunities available. For an employer,

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

3.112 Travel to work analysis indicates that within the Energy Coast's labour markets are geographically concentrated around the east and west coasts. Travel to work across the Pennines is minimal and journeys to work are predominantly only as far as the neighbouring town. These economically detached/self-contained travel patterns constrain the Corridor's economic potential. This limited reach of labour markets means that Northern workers have reduced job opportunities, and Northern employers have limited labour markets. This is holding back wages and productivity and makes the North a less attractive place for businesses.

3.113 Improved connectivity to Important Economic Centres, as shown in Figure 21 will assist with increased engagement in the labour market, access to skills and improved interaction between centres. At present the sub-regional economies are largely self-contained due to poor connectivity. Infrastructure improvements will seek to deliver significant opportunities for the economy. Car journeys dominate travel to work in the Connecting the Energy Coasts SDC. Journeys by rail are focussed on Newcastle and Sellafield, and a smaller number focussed on Lancaster and Middlesbrough.

Figure 21 Important Economic Centres in Connecting the Energy Coasts SDC



3.114 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 often at the periphery of the North's transport network and can be more susceptible to incidents on the network.

3.115 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.

3.116 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.

Connecting People: Accessibility for Visitors to the Connecting the Energy Coasts SDC

3.117 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 within the corridor, which account for 10% of all similar 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 5 Visitor trips made to the North as a whole, North West and North East relative to the UK[33]

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
UK Total	**52,848**	**100.0**	**22,549**	**100.0**	**21,027**	**100**	**96,724**	**100.0**	**1,789,333**	**100.0**

3.118 In 2014[34], tourism in the North West and North East directly employed 233,000 people, and had a value of £12,576 million. Day trip and Holiday volume and spend are summarised by local authority area for the Energy Coast SDC in Table 6.

[33] Source: Tourism: Jobs and Growth, VisitBritain / Deloitte, 2013 & Deloitte, 2013, DETI, Inter Departmental Business Register 2014

[34] Source: UK Tourism Statistics (Tourism Alliance, 2017)

Table 6 Day trip and holiday volume and spend by Local Authority area[35],[36]

Local Authority	Day trips		Overnight trips	
	Volume (m)	Spend (£m)	Volume (m)	Spend (£m)
Cumbria	3.5	£737	2.6	£613
Lancashire	2.9	£519	1.7	£358
Northumberland	1.0	£236	0.8	£189
Tyne and Wear	1.5	£283	0.4	£92
Durham	0.8	£111	0.3	£49
Tees Valley	0.4	£63	0.1	£16

3.119 Key specific tourist destinations and activities include Lake Windermere, where Lake Cruises have over 1.4 million visitors per year[37], Durham Cathedral with 755,000 visitors per year and the Fylde Coast which is a key tourist destination in the North-West and includes Blackpool, one of the UK's largest seaside resort in terms Annual Average Overnight Holiday Trips[38].

3.120 In 2017 Cumbria attracted 47 million visitors, around 10% of which were overseas visitors.

3.121 The Connecting the Energy Coasts SDC provides access to a number of designated high value landscapes which are important to the visitor economy including: Northumberland, North York Moors, Yorkshire Dales and the Lake District national parks; eight AONB and four Heritage Coasts. Furthermore, the SDC contains a Dark Sky Reserve at Northumberland National Park and Kielder Water and Forest Park. This is one of England's two International Dark Sky Parks.

Connecting People: Connecting Businesses, Economic Assets and Clusters in the Connecting the Energy Coasts SDC

3.122 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.

3.123 The Connecting the Energy Coasts SDC provides connections to: the majority of the major cities in the North; key international gateways at Newcastle Airport, Port of Tyne, Port of Sunderland and Tees and Hartlepool; and areas of employment in agglomeration sensitive industries, see Figure 22.

[35] Source: North East England and Domestic Tourism (Visit England, 2015)

[36] Source: North West England and Domestic Tourism (Visit England, 2015)

[37] Source: Visitor Attractions and Domestic Tourism (Visit England, 2015)

[38] Source: England's Seaside: What are the Opportunities (Visit England, 2012)

3.124 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.

3.125 The Corridor contains significant sets of clusters in key sectors which have the potential to compete on the national and international scale.

3.126 The Connecting the Energy Coasts SDC links a cluster of advanced manufacturing and energy generation facilities located in the North East, Tees Valley, Lancashire and Cumbria and also North Yorkshire as can be seen in Figure 23.

Figure 22 Density of agglomeration sensitive industries

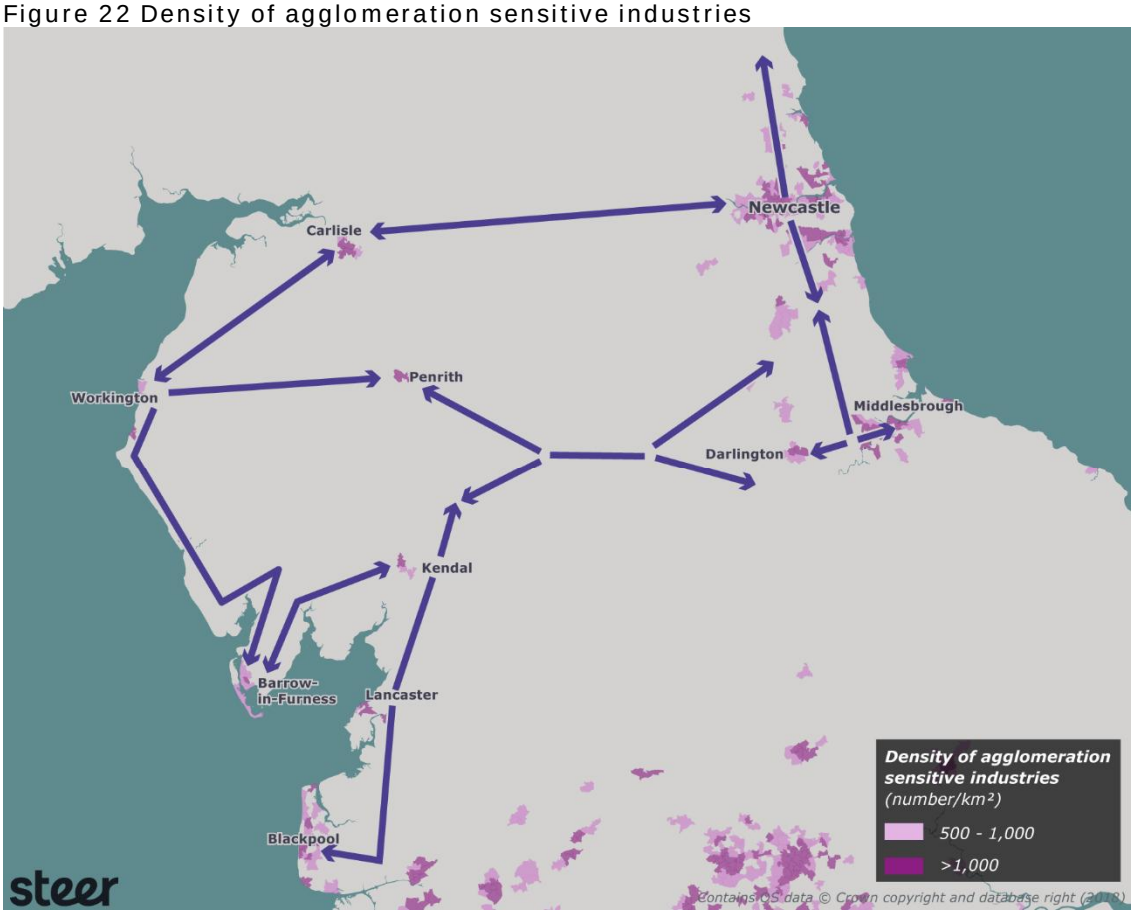
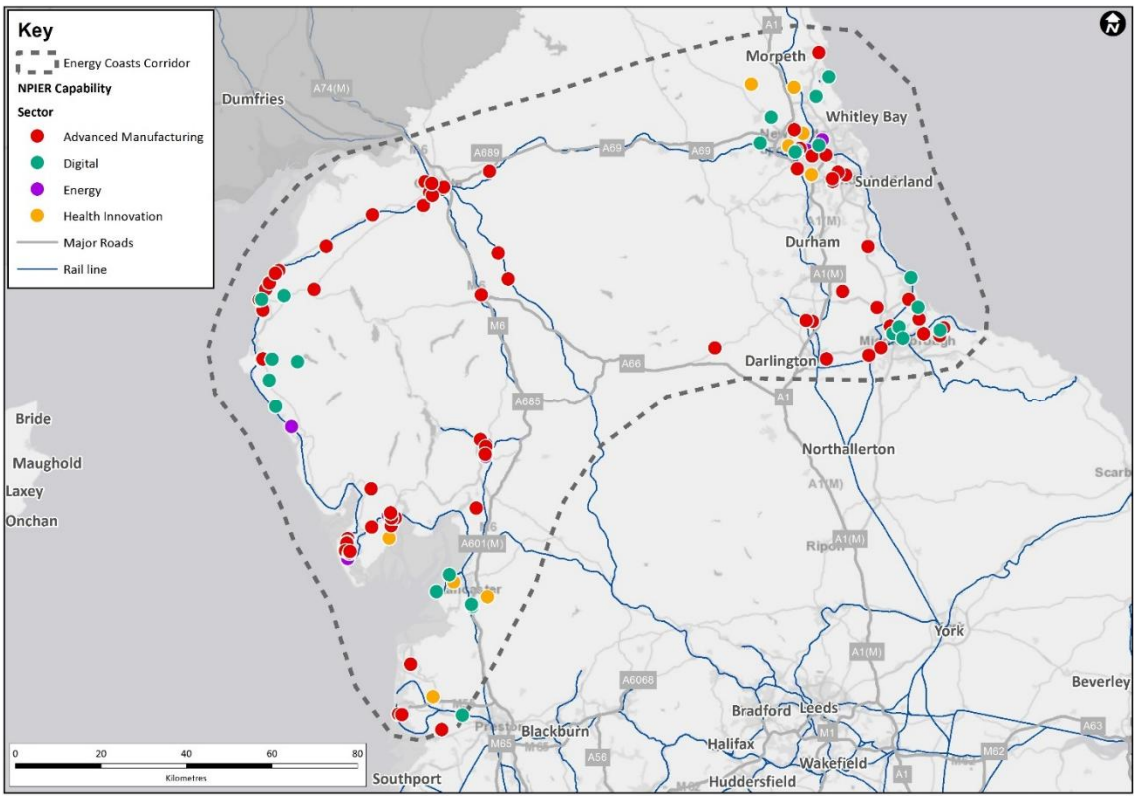


Figure 23 NPIER capabilities in the Connecting the Energy Coasts SDC



3.127 Key strengths and priorities for the LEPs across the study area include Advanced Manufacturing, Energy and Nuclear excellence, Digital Technologies and an important visitor and tourism economy across the entire study area.

3.128 Enhanced connectivity can support complementary high-growth, high-value economic sectors and clusters and could attract new high-value business activity and inward investment to the corridor and the North. Many of these clusters have supply chains that rely on good connectivity within the North.

3.129 Transformational growth projections forecast material increases in highway and rail trips. Underlying these 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 Connecting the Energy Coasts 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.

3.130 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.

Connecting People: Supporting International Connectivity of the Connecting the Energy Coasts SDC

3.131 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 could be made directly to the North's ports and airports. Enhanced connectivity to global markets are closely linked to levels of foreign direct investment.

3.132 There is a need to address connectivity gaps in relation to airport access on the Cumbrian Coast. This area is both poorly connected to airports within the Connecting the Energy Coasts SDC, but also Manchester, the North's largest airport.

3.133 Improved east-west road and rail connectivity would improve access to global markets via Newcastle and Durham Tees Valley airports. For communities and businesses on the west coast, improved east-west connectivity would also reduce travel times to Manchester airport by facilitating access to the key north-south M6 spine and WCML.

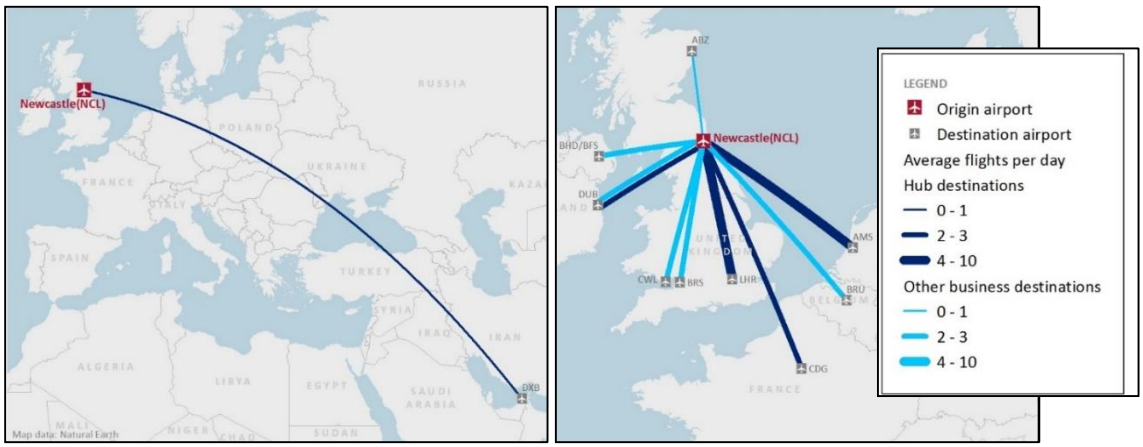
3.134 Improved international connectivity will also benefit the wider supply chain and visitor economy across the North, as well as creating agglomeration effects from faster, more reliable connections between key areas of employment, with £2 billion spending by 4.5 million overseas visitors. Increasing 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.

Supporting the connectivity of international business to the Connecting the Energy Coasts SDC

3.135 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.

3.136 In terms of connectivity between adjacent areas, good connectivity between the Connecting the Energy Coasts SDC and Manchester, Edinburgh and Glasgow Airports are vital to provide long haul routes not provided by airports within the corridor. 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 24 Newcastle Business/Hub Destinations



Moving Goods: Domestic

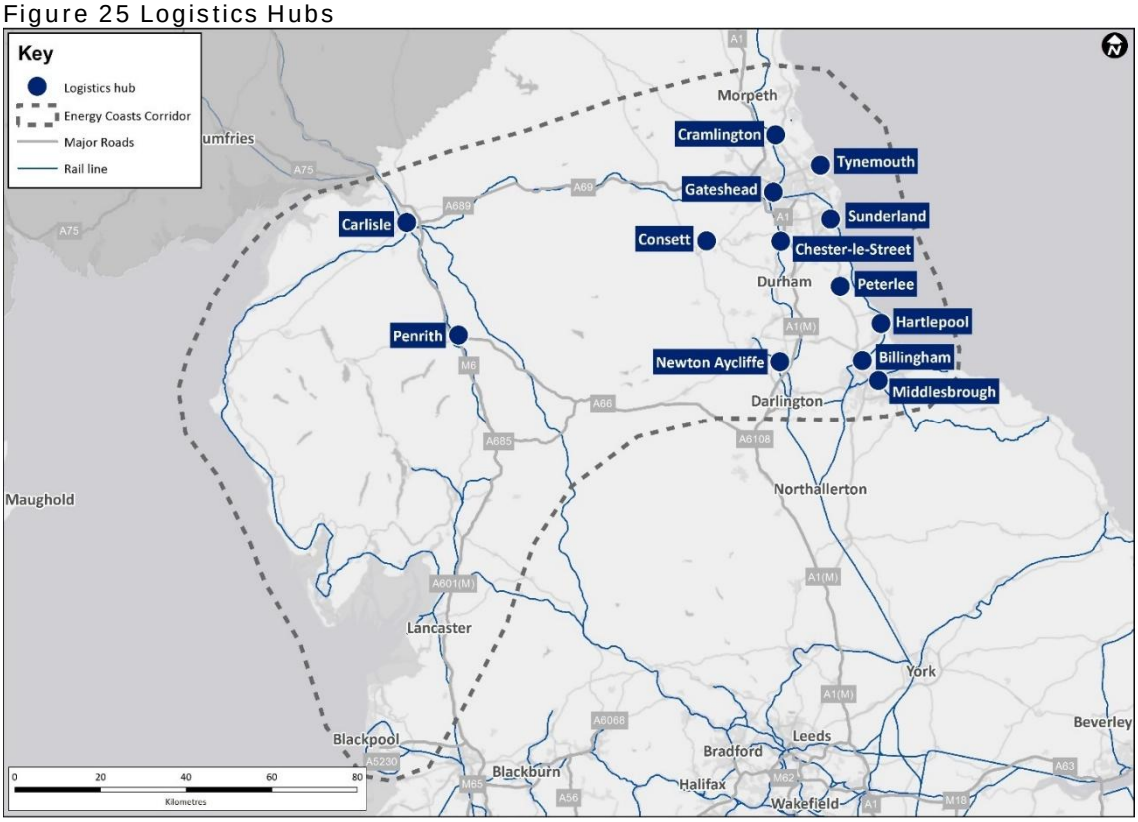
3.137 In addition to dedicated freight and logistics companies within the North, freight movements are an important part of supply chains for most businesses including the North's prime capabilities, The North has a significant amount of distribution centre capacity covering all types of warehousing, a large proportion of this is located in the east of the study area, see Figure 25.

3.138 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.

3.139 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 A66 and A69.

3.140 Road freight in particular faces specific issues including a lack of overnight parking facilities for HGVs adjacent to the MRN.

Figure 25 Logistics Hubs



3.141 The *Enhanced Freight and Logistics Analysis* 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. Poor availability of HGV parking facilities and service areas remains an important consideration for road based freight operations.

3.142 With the proposed rise in freight traffic from 2016 to the forecast year of 2050 with NPIER Growth, there are significant concerns regarding regional air quality and contribution of emissions to the atmosphere in the North. Within the Corridor, the largest road freight growth is predicted to be on the M6 between Preston and the Scottish Border. The routes in the north-east and the Trans-Pennine corridor will experience significantly lower growth than other major routes within the North.

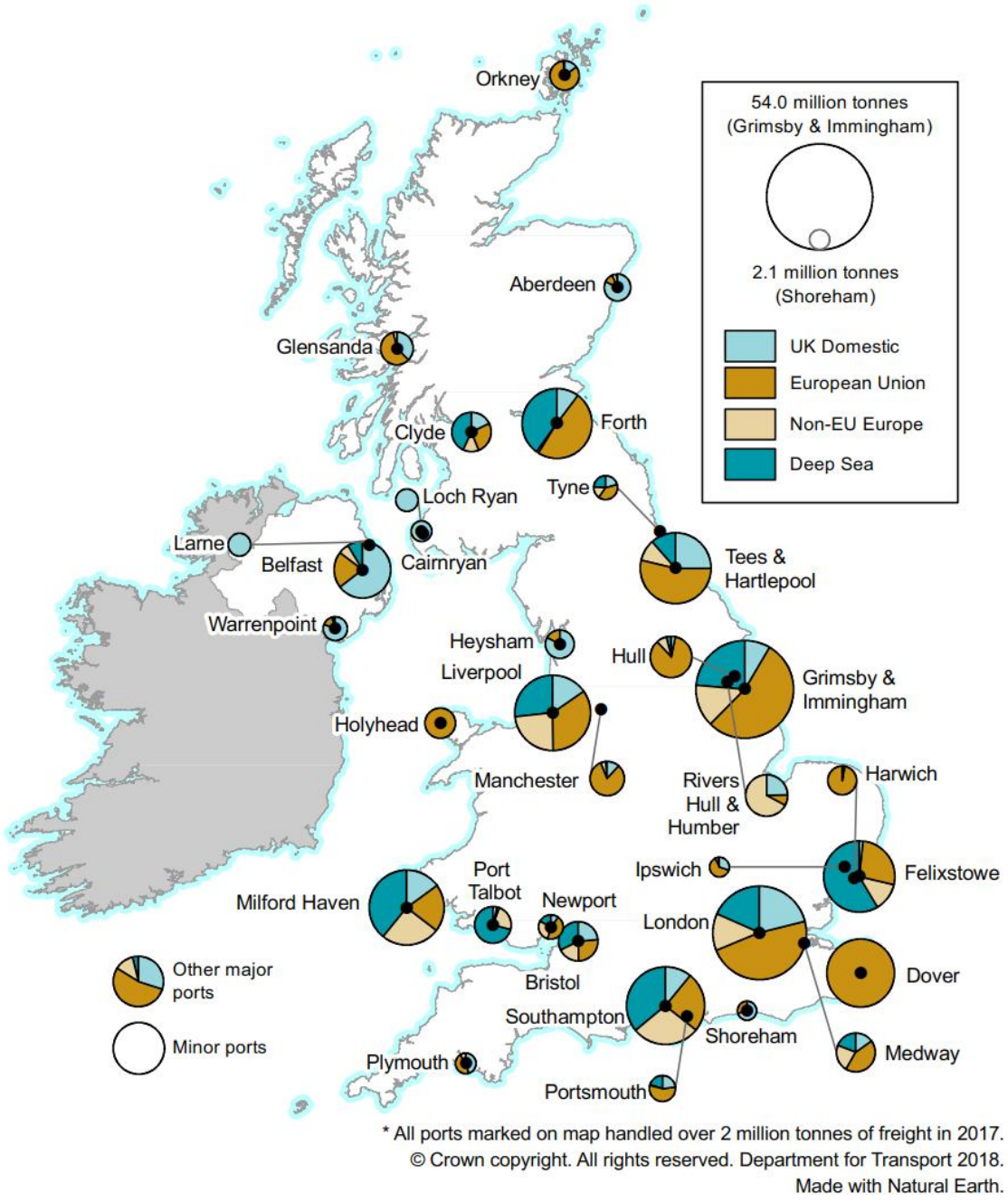
Moving Goods: International

3.143 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 26 displays the level of domestic and international freight tonnage by port in the UK. Tees and Hartlepool port makes a significant contribution to the domestic and international freight markets and improved connectivity will encourage future market share.

3.144 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. Hence the SDC area has a very small international air freight market, with airports outside of the corridor providing additional international connectivity.

3.145 The lack of long haul flights also reduces opportunities for belly-hold freight. The North has an extremely small air freight market (less than 500k tonnes carried by East Midlands and Manchester airports together, out of a UK total of 2.38m tonnes) with the majority moving to and from the region doing so via airports further south, contributing to road traffic and congestion. Increasing opportunities for freight to be shipped via northern airports could contribute to traffic reductions on north-south routes as well as increasing competitiveness.

Figure 26 UK Major Ports – Domestic and International Annual Freight Tonnage[39]



Supporting the Built/Natural Environment

3.146 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 Promoting and supporting the natural environment and built environment with respect to sustainable travel

[39] Source: DfT UK Port Freight Statistics, 2017 (Statistical Release August 2018)

options associated with the major transport networks will be a key opportunity and necessity of future transport initiatives.

3.147 Poorly located or designed transport infrastructure has the potential to degrade existing landscape character and visual amenity. Considering the significant areas covered by National Parks within the SDC, and that the Pennines (which contain designated and non-designated landscapes including the Yorkshire Dales National Parks) run north-south through the centre of the SDC and cover a significant part of the SDC, any efforts to improve connectivity through the Pennines, Lake District, Yorkshire Dales or Northumberland National Park and their fringes will risk significant adverse landscape impacts. As such, the development of any transport schemes within the SDC should where possible avoid sensitive areas, and in all cases ensure they respect landscape character and visual amenity.

3.148 Reducing carbon emissions and improving air quality is now a central requirement for the transport, freight and logistics sector. In October 2017 the Government published 'The Clean Growth Strategy'. This includes measures to accelerate the shift to low carbon transport and collaborate with industry to reduce the impact of freight emissions and improve air quality across all transport modes. In 2018 the Government published 'Road to Zero' which sets out new measures to reduce emissions from road transport and lead the world in the developing, manufacturing and using zero emission road vehicles. Reducing air pollution and reducing carbon emissions from transport are also key aims within TfN's STP, and the plan has been developed using an Integrated Sustainability Appraisal (ISA) process to ensure that potential significant negative effects arising from the Plan are identified, assessed, and mitigated as necessary, and that positive effects are enhanced. There is a need to investigate and understand the different options for the study Corridor to move towards delivery of alternative fuelling and operation.

Summary of Transport Issues

3.149 There is a need to provide improved road and rail connectivity within the Connecting the Energy Coasts Corridor both in terms of cross corridor east-west movements and north-south movements on the east and west coast road and rail routes. Resiliency is also a key issue of the existing network.

3.150 Across the corridor there is a diverse mix of strategic movements to cater for. Freight and logistics support the ports and airports as well as servicing the businesses located across the corridor. Improving connectivity would accelerate increased employment, new developments, and increase the scale of the overall growth opportunity. Improving connectivity would also support tourism and access to the natural landscape assets of the corridor by residents. The transport issues must be addressed alongside the need to support the natural and built environment and reduce carbon and other vehicle emissions. This will be supported by innovation in the transport industry which strong local research and manufacturing in the Connecting Energy Coasts SDC will contribute.

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

- Improving connectivity and resilience to West Cumbria from the M6/WCML corridor
- Improve east-west TransPennine connectivity and journey times
- Improve access to International Gateways (Carlisle Lake District Airport, Newcastle Airport, Port of Workington Port of Barrow, Port of Blyth, Port of Sunderland, Port of Tyne, Port of Tees:
- Improve the connectivity and resilience of key north-south links between functional economic centres on the eastern side of the Pennines
- Improve connectivity and resilience to Tees Valley from the A1(M)/A19 and ECML Corridor
- Improve accessibility at key transport interchanges

3.152 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 Connecting the Energy Coasts 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 and capacity 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 7 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	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	

transport system	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?
	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 (CO_2, NO_x, 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	Supporting the delivery of Transformational Infrastructure and employment projects	Does the scheme improve access to economic assets of National of Pan-Northern significance?

opportunities for all	Supporting and enhancing the visitor economy	Does the scheme improve access to major tourist destinations?
	Supporting and enabling the delivery of strategic housing sites	Does the scheme improve integration with local transport networks?
	Supporting an affordable inclusive transport network with enhanced access to key opportunities, education and skills.	
	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 Connecting the Energy Coasts 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 Connecting the Energy Coasts SDC includes 41 different NCAs. Designated high value landscapes within the Connecting the Energy Coasts 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 present a high risk of significant environmental impacts.

Interdependencies

Reference Case

5.9 As set out in the reference case definition, the basis against which the programme of interventions in the Connecting the Energy Coasts 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[40], 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.

[40] Global Railway Review (2018) https://www.globalrailwayreview.com/news/67419/hs2-npr-ambitions-greater-manchester/

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[41], 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.

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

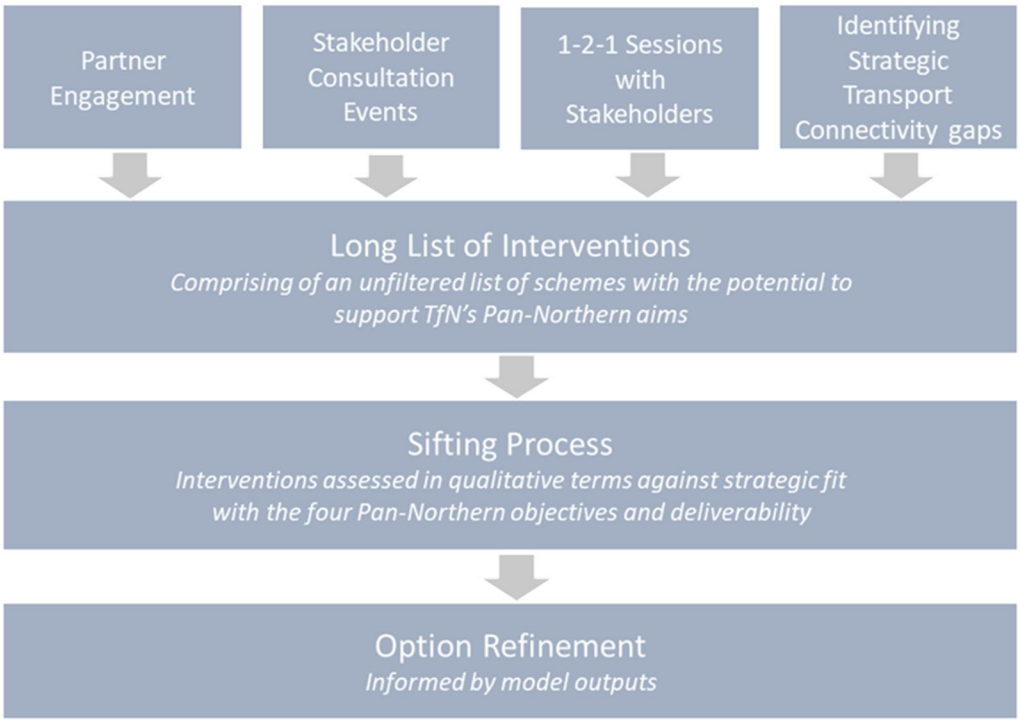
6 Option Assessment Process

Overview

6.1 A staged approach has been taken to the identification of Pan-Northern transport schemes in the corridor as shown in Figure 27.

[41] ibid

Figure 27 Staged approach to Pan-Northern transport scheme identification



Option identification and shortlisting

6.2 The Option Assessment Process outlines the different steps undertaken to identify and shortlist priority interventions for the Connecting the Energy Coasts corridor which will ensure options included act as enablers of major development and positive change in the form of new opportunities for people and business. A thorough approach was undertaken including the consideration of strategic priorities, multiple criteria as well as different future scenarios to identify an initial set of options. In the following step, an additional sift process was applied to distinguish the final set of interventions. The following section describes this process.

6.3 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, Welsh Government's National Transport Finance Plan and local authority schemes. The longlisting exercise took account both of Pan-Northern outcomes, emerging policy and future technology developments.

6.4 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 7). 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 8, and aided through application/ reference to a set of metrics (covering the four-point scale) for each performance indicator.

Table 8 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	

6.5 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.

6.6 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.
- Complimentary 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.

6.7 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

6.8 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.

6.9 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.

6.10 Due to the reliance on a NTEM core demand scenario only it has been necessary 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 requiring further development and analysis.

6.11 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

6.12 A final Strategic Outline Programme (SOP) of interventions for the Connecting the Energy Coasts SDC has been defined and is presented below in Table 9 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.

6.13 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 10, 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.

6.14 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. Table 11 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 Connecting the Energy Coasts geography.

6.15 Graphical representation of the SOP interventions are shown in Figure 28 for road and Figure 29 & Figure 30 for passenger rail at a Northern (combined SDC) and Connecting the Energy Coasts SDC 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 9 Strategic Outline Programme of Interventions

Key Pan Northern Outcomes within the Energy Coasts SDC	Status	Road	Rail/ Public Transport
Improve connectivity and resilience to West Cumbria from the M6 / West Coast Mainline corridor	SDC Reference Case	• A595 Carlisle Southern Link Road • A595 Capacity Upgrade between Mealsgate and Moota (Bothel / Moota) • A595 / Homewood Road Junction Improvements • A595 / Pelican Garage / New Road Junction Improvement • A595 Beckermet Junction and Moorside / Sellafield Junction Improvements • A595 / Inkerman Terrace Junction Improvements • A595/A66 Fitz and Great Clifton Junction Improvements • A66 Brigham Broughton Junction Improvement • Whitehaven Relief Road • A595 Grizebeck improvements • Cross-a-Moor Junction Improvement • New link between A6 and A591 to the north of Kendal	• Energy Coast Rail Upgrade (Freight)
	SDC SOP intervention	• A66 East of Penrith to M6 Junction 41 improvements • A590 dualling and wider capacity, journey time and resilience improvements • Ulverston Bypass • A595 Bigrigg Bypass • A595 Egremont Junctions - increase ICD of both roundabouts • A66 Scales/ Troutbeck Climbing Lanes • A66/A596/Ramsay Brow Junction Improvements (Workington) • Newby Bridge Flooding Alleviation • Carlisle to Cockermouth capacity and reliability Improvements	• Energy Coast Rail Upgrade - Journey time and capacity improvements • Furness Line - Journey time and reliability improvements

Transport interventions shown are draft and indicative only at this stage as indicated and should not be relied upon for planning purposes.

Key Pan Northern Outcomes within the Energy Coasts SDC	Status	Road	Rail/ Public Transport
Improve connectivity and resilience to the Fylde Coast from the M6 / West Coast Mainline corridor	SDC Reference Case	• New Ribble Road Crossing to link Preston and South Ribble* • A585 Windy Harbour – Skippool • Yeadon Way Access Route Upgrade • Preston Western Distributor and new M55 J2 • M55 J4 Heyhouses Link Road • M6 Junction 33 Improvements	• Manchester - Preston Improvements
	SDC SOP intervention	• M55 to Fleetwood Corridor Improvements • A582 South Ribble Western Distributor*	• South Fylde Line (journey time and capacity improvements) • Enhanced public transport links to Fleetwood • Journey time improvements Preston - Blackpool North
Improve east-west Trans-Pennine connectivity and journey times	SDC Reference Case	• A69 junction improvements at Corbridge and Hexham • A66/A6 Junction Upgrade • A66 Dualling Completion	• Northern rail franchise service enhancements
	SDC SOP intervention	• A689 M6 to Carlisle Lake District Airport capacity improvements and improved M6 connectivity • A69 route improvement, climbing lanes and targeted junction Improvements (including the B6351 Hexham west junction) • A69-A696-A1 link to form a NW ring road of Newcastle via the airport • A66 to A1 New Link and Junction north of Scotch Corner • A689 SRN to improve the route function	• Tyne Valley Line - route upgrade and service improvements
Improve access to International Gateways - Carlisle Lake District Airport, Newcastle Airport, Port of Workington, Port of Barrow, Port of Blyth, Port of Sunderland, Port of Tyne, Port of Tees	SDC Reference Case	• Port of Workington Access Bridge • A185/A194/A19 Traffic Movements (The Arches Junction) • Blyth Relief Road	
	SDC SOP intervention	• Port of Workington to A66 connectivity improvements • improved access to Newcastle International Airport - Seaton Burn to Ncl Airport • Tees Dock Road Roundabout Capacity Improvements • A174 Greystones Roundabout Improvements	• East Coast Main Line spur to Newcastle Airport

Transport interventions shown are draft and indicative only at this stage as indicated and should not be relied upon for planning purposes.

Key Pan Northern Outcomes within the Energy Coasts SDC	Status	Road	Rail/ Public Transport
Improve the connectivity and resilience of key north-south links between functional economic centres on the eastern side of the Pennines	SDC Reference Case	• A1 Leeming to Barton improvement • Expansion of Tyne and Wear's Urban Traffic Management and Control (UTMC) Services • A1 Birtley to Coal House • A1 Scotswood to North Brunton • A1 North of Ellingham • A1 Morpeth to Ellingham Dualling • A19/A1058 Coast Road junction improvement • A19 Testos and Downhill Lane junction improvements • A19/A194 and A19/A185 Lane gain/drop arrangement • A19 Moor Farm Junction Improvements • A19/A182 Junction Improvements • Northern Gateway - Two Way Traffic Dame Dorothy Street • Sunderland Strategic Transport Corridor, Stage 3 - New Wear Crossing to St Mary's Roundabout • Durham Northern Relief Road	• HS2 Phase 2b • East Coast Main Line power supply upgrade • Horden Peterlee station
	SDC SOP intervention	• A1(M) Barton to Chester-le-Street widening (J56-J57 and J60-J63) • A19 Seaton Burn Junction Improvements • A187 upgrade and port access roads • Sunderland Strategic Transport Corridor, this is specifically phases 4 and 5 • A194 and A185 upgrade to unlock pinch points on the Southside Port of Tyne as well as upgrades to the A187 and port access roads • A194(M) Whitemare Pool Junction Improvements • NECA New Strategic River Crossing • South of Tyne Park and Ride improvements	• Durham Coast Line (route upgrade and service improvements) • Middlesbrough Station • Darlington Station Growth Hub • Sunderland Station and Sunderland Station track layout improvements • Northallerton - Newcastle capacity enhancements and timetable resiliance • Newcastle Station

Transport interventions shown are draft and indicative only at this stage as indicated and should not be relied upon for planning purposes.

Key Pan Northern Outcomes within the Energy Coasts SDC	Status	Road	Rail/ Public Transport
Improve connectivity and resilience to Tees Valley from the A1(M) / A19 and East Coast Mainline Corridor	SDC Reference Case	• Darlington Growth and Enterprise Zone Connectivity • Cargo Fleet Roundabout Capacity Improvements • A1(M) J59 Junction Capacity Improvements • A171 Swans Corner to Flatts Lane Improvement • A19 Norton to Wynyard • A66 Darlington Northern Link Road • New Tees Crossing: Newport Option and Viaduct Option.	
	SDC SOP intervention	• A66 (East of Durham Lane to A135) • A66 Elton Interchange Junction Capacity Improvements • A66/A1150 Little Burdon Roundabout Junction Capacity Improvements • A66 Morton Palms Roundabout Junction Capacity Improvements • A66 Morton Palms to Little Burdon Extra Lanes	• Middlesbrough - York journey time and service improvements • Bishop Auckland to Saltburn Lines journey time improvements
Improve accessibility at key transport Interchanges	SDC Reference Case		HS2 Phases 1, 2a and 2b including all necessary station works to accommodate services; Northern Powerhouse Rail programme; North West Electrification programme; Committed service frequency and rolling stock enhancements via Franchises
	SDC SOP intervention		Capacity and passenger facility improvements at Darlington; Rail/ Metro integration improvements within Tyne and Wear to include routes, stations and timetabling.

Transport interventions shown are draft and indicative only at this stage as indicated and should not be relied upon for planning purposes.

Table 10 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 11 Warehousing growth by region (assumptions made for freight modelling of clustered warehousing)

The potential locations in the table below are draft and indicative only at this stage as indicated and should not be relied upon for planning purposes.

Location	Local AU[42]	Region
Port of Tyne	South Tyneside	North East
Jarrow Oil Terminal	South Tyneside	North East
East of Gateshead	South Tyneside	North East
Middlesbrough	Middlesbrough	North East
Redcar	Redcar and Cleveland	North East
Appleby	Eden	North West

[42] Local Administrative Unit

Figure 28 Connecting the Energy Coasts SDC Road Reference Case and SOP Proposals

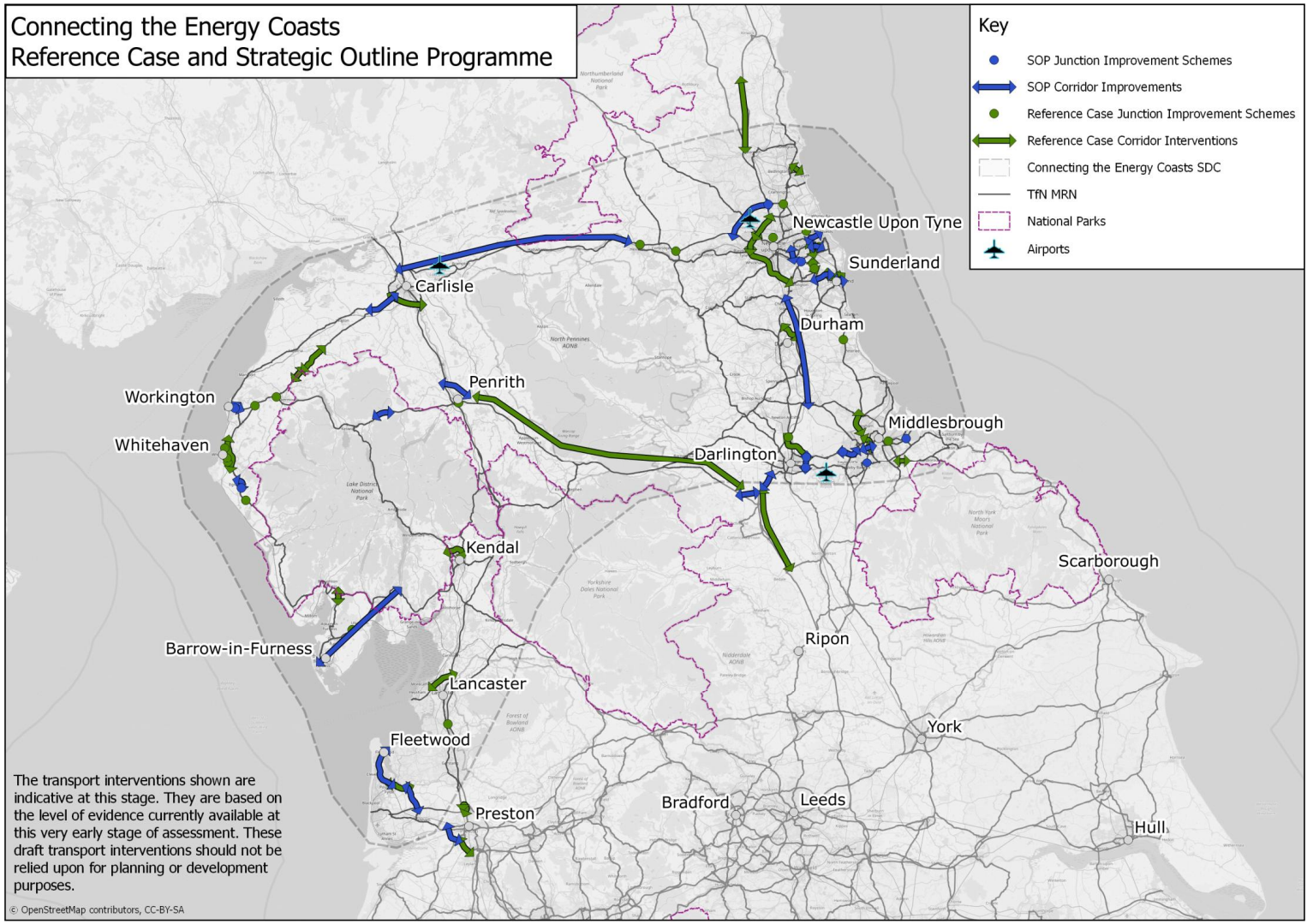


Figure 29 Passenger Rail SOP Proposals across the Strategic Development Corridors

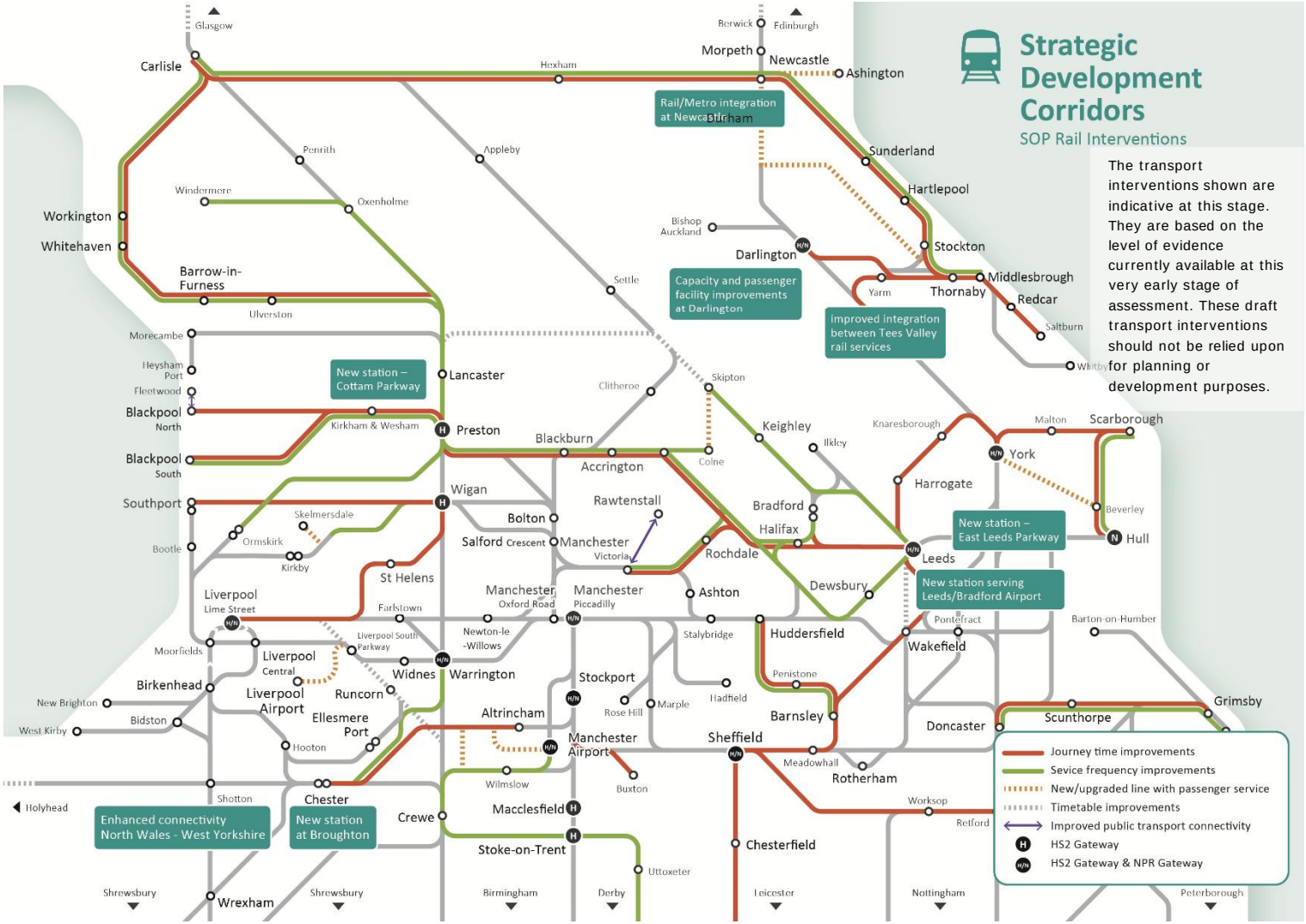
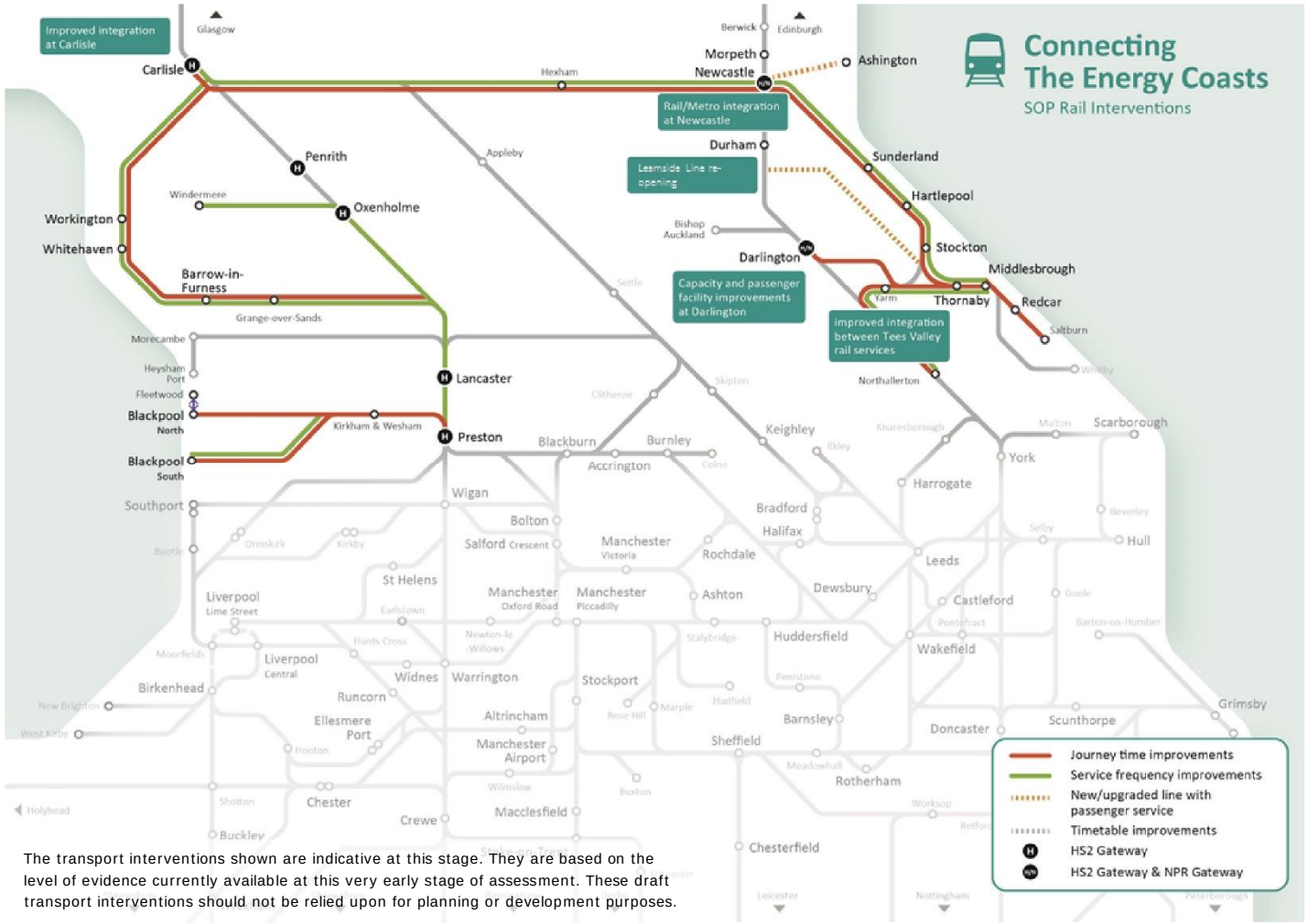


Figure 30 Connecting the Energy Coasts SDC Rail SOP Proposals



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. These draft transport interventions should not be relied upon for planning or development purposes.

Stakeholder Consultation

6.18 Given the wide-ranging impacts of the proposed schemes in this study, a wide range of stakeholders, with a vested interest in the study, were identified.

6.19 TfN undertook three Stakeholder Consultation sessions for the Connecting the Energy Coasts 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:

Stage 1	Stage 2
21st November 2017 - Darlington	26th February 2018 - Newcastle
23rd November 2017 - Newcastle	27th February 2018 - Whitehaven
24th November 2017 - Carlisle	6th March 2018 - Stockton

6.20 Key issued raised included:

- Reliability and capacity where felt to be more important than speed
- Resilience was an issue with a need for alternative options when key routes are closed due to bad weather, flooding or accidents
- Many key routes have long single carriageway sections (A66, A69, A590)
- Better connectivity to the ports (Tyne, Tees, Workington) was felt to be important, including first/last mile connections
- It was felt that the Connecting the Energy Coasts SDC could make the most of HS2/NPR opportunities
- There is opportunity to connect Newcastle Airport to the ECML
- Rail links to major conurbations are important for recruiting a skilled workforce
- Major economic growth is planned in several centres (eg. Barrow, Tees Valley) and needs to be considered
- There was concern that with a focus on M62 corridor the North East and North West could be overlooked
- Introduction of more smart ticketing was desirable

6.21 The following key themes were then addressed:

Issue raised	Influence on Optioneering
Reliability, resilience and capacity	A wide range of proposals are included to support reliability, resilience and capacity and include (but are not limited to) interventions to the A66 (East of Durham Lane to A135, M55 J3 to Windy Harbour/Skippool and a new link between A66 east of Penrith and Junction 41 of M6.
Improved connectivity to ports and airports	Proposals to support improved connectivity to ports and airports include (but are not limited to) a link road from the A66 to the Port of Workington, improved access to Newcastle

	International Airport and Tees Dock Roundabout Capacity improvements.
HS2	Making the most of HS2 opportunities
Improved rail connectivity	Proposals to support improved rail connectivity include (but are not limited to) the Durham Coast route upgrade and service improvements, and Sunderland Station track layout improvements.

7 Strategic Dimension Summary

7.1 This document sets out the clear case for the strategic importance and necessity of the proposed programme of interventions in the Connecting the Energy Coasts SDC. It is necessary to be ambitious to meet DfT and TfN's objectives and support the region's as well as Britain's future prosperity by investing in a modern and reliable transport network that will help re-balancing the British economy, improve overall regional productivity and leading to overall more sustainable economic development.

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 the reference case. 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 Connecting the Energy Coasts corridor but also the wider competitiveness of the UK.

7.3 This document has 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 Connecting the Energy Coasts 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 The Option Assessment Process was described, allowing a transparent review of how 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 wider economic impacts 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 Connecting the Energy Coasts 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 7 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 Connecting the Energy Coasts SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance[43] (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[44], as specified by WebTAG.

8.9 The proportionate approach to the VfM appraisal of the Connecting the Energy Coasts SDC Programme was set out in the Stage 1 Appraisal Specification Report[45] (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; Connecting the 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,

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[43] Department for Transport, *Transport Appraisal Guidance* (2018) https://www.gov.uk/guidance/transport-analysis-guidance-webtag

[44] For further details, see paragraph 10.10 onwards

[45] Product 04: Appraisal Specification Report (February 2018)

have been included within the 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[46]. In contrast, the option identification and selection process was based on the assumption that the transformational economic growth identified in 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[47].

8.13 Table 12 below lists the final strategic outline programme of road interventions that have been appraised at this very early stage of programme development for the Connecting the Energy Coasts SDC, alongside those interventions that have a strong strategic case but are not adequately represented by the NTEM Core travel market scenario, and requiring further development and analysis at the next stage of work which will include transformational growth scenarios.

[46] 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.

[47] 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.

Table 12 Appraisal of Strategic Outline Programme of Road Interventions

Road Interventions Appraised within the Economic Dimension
· Road Interventions Appraised within the Economic Dimension: · A595 Partial route upgrade Carlisle to Cockermouth capacity (Carlisle to Thursby dualling) · A595 Bigrigg Bypass · A595 Egremont Junctions - increase ICD of both roundabouts · Port of Workington to A66 New Link Road · A66/A596/Ramsay Brow Junction Improvements/ Widening (Workington) · A590 Full Dualling · Ulverston Southern Bypass · M55 to Fleetwood Corridor Improvements (M55 J3 Windy Habour / Skippool) · A689 Dualling and Junction improvements (new Junction with A689/M6 - dualling A689 to Carlisle Airport) · A69-A696-A1 link to form a NW ring road of Newcastle via the airport · A66 to A1 New Link and Junction north of Scotch Corner · A1(M) Barton to Chester-le-Street widening · A19 Seaton Burn Junction Improvements · A187 upgrade and port access roads · Sunderland Strategic Transport Corridor, this is specifically phases 4 and 5 · A194 and A185 upgrade to unlock pinch points on the Southside Port of Tyne as well as upgrades to the A187 and port access roads · NECA New Strategic River Crossing · A66 (East of Durham Lane to A135) · A66 Elton Interchange Junction Capacity Improvements · A66/A1150 Little Burdon Roundabout Junction Capacity Improvements · A66 Morton Palms Roundabout Junction Capacity Improvements · A66 Morton Palms to Little Burdon Extra Lanes
Road Interventions Not Appraised within the Economic Dimension at this stage
· A689 SRN to improve the route function · A69 route improvement, climbing lanes and targetted junction Improvements (locations to be developed) · New link between A66 east of Penrith and Junction 41 of M6 · A66 Scales/ Troutbeck Climbing Lanes · Newby Bridge Flooding Alleviation · Tees Dock Road Roundabout Capacity Improvements · A174 Greystones Roundabout Improvements · Improved access to Newcastle International Airport - Seaton Burn to Ncl Airport · South of Tyne Park and Ride improvements
Road Interventions Not Appraised within the Economic Dimension at this Stage of this SDC; Appraised in Another SDC
· New Ribble Road Crossing to link Preston and South Ribble · A582 South Ribble Western Distributor

Table 13 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
· 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 Transpennine 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[48] 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 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[49]:

- 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 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 impacts 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 7), 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.

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[48] Department for Transport, TAG unit A4-2 distributional impact appraisal (2015) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/638644/TAG_unit_a4.2_distrib_imp_app_dec2015.pdf

[49] DfT DI Guidance excludes employers' business trips and impacts during construction

8.18 It is further noted that the two 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 15 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 Energy Coasts 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[50] 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 Connecting the Energy Coasts SDC programme adopts the proportionate approach of assuming a single opening year for all interventions. For

[50] For further details, see paragraph 2.22 onwards

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 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 Connecting the Energy Coast economic appraisal considers the capital cost of the SOP programme itself, together with any changes in the capital cost of operation and maintenance in future years. Only those schemes presented in Table 12 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 Connecting the Energy Coast SDC, all monetary units are presented in 2010 discounted market prices.

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

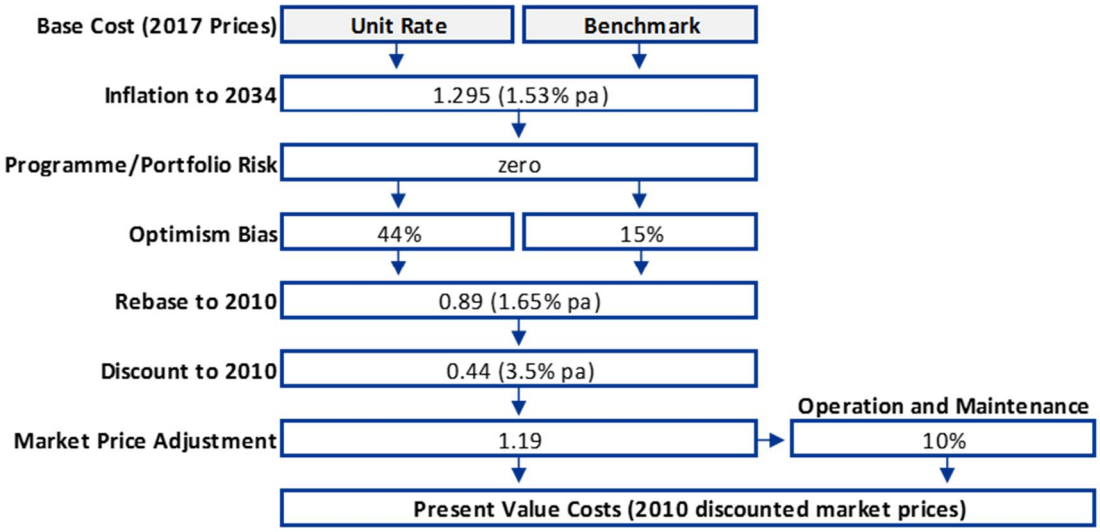
- Unit Rates – a series of rates per km or per intervention type provided by Benchmark which drew upon their industry knowledge and database which contained scheme cost information which was not publicly available. These unit rates include all construction costs, design and preparation, lands costs, enabling works, supervision, statutory undertakers and third party infrastructure costs before risk and inflation.
- Benchmark – Some schemes within the Connecting the Energy Coasts 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 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 31. Further details are provided below and in the Economic Assessment Report.

Figure 31 Estimation of Costs for Appraisal



9.11 Table 23 in Chapter 14 presents the Connecting the Energy Coast 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 Connecting the Energy Coast 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 Connecting the Energy Coasts 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
- Freight and Logistics Modelling

Highway Demand Modelling

10.3 Highway forecasting was undertaken using a modified version of the Highways England 2015 North Regional Transport Model (RTM). The model zoning was reviewed and dis-aggregated 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 (VOC) 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 32. The difference plot shows an increase in flows along the A1 and along the eastern and western sections of the A69. To the north east of Newcastle there is a reduction of flow on the A1 as vehicles transfer to the new airport link road.

10.9 Figure 33 provides a spatial summary of the economic benefits. This shows that benefits are generated across the Connecting the Energy Coasts SDC area. The largest benefits are generated in Sunderland and Newcastle.

Figure 32 2050 AADT Flow Difference SOP – Reference Case

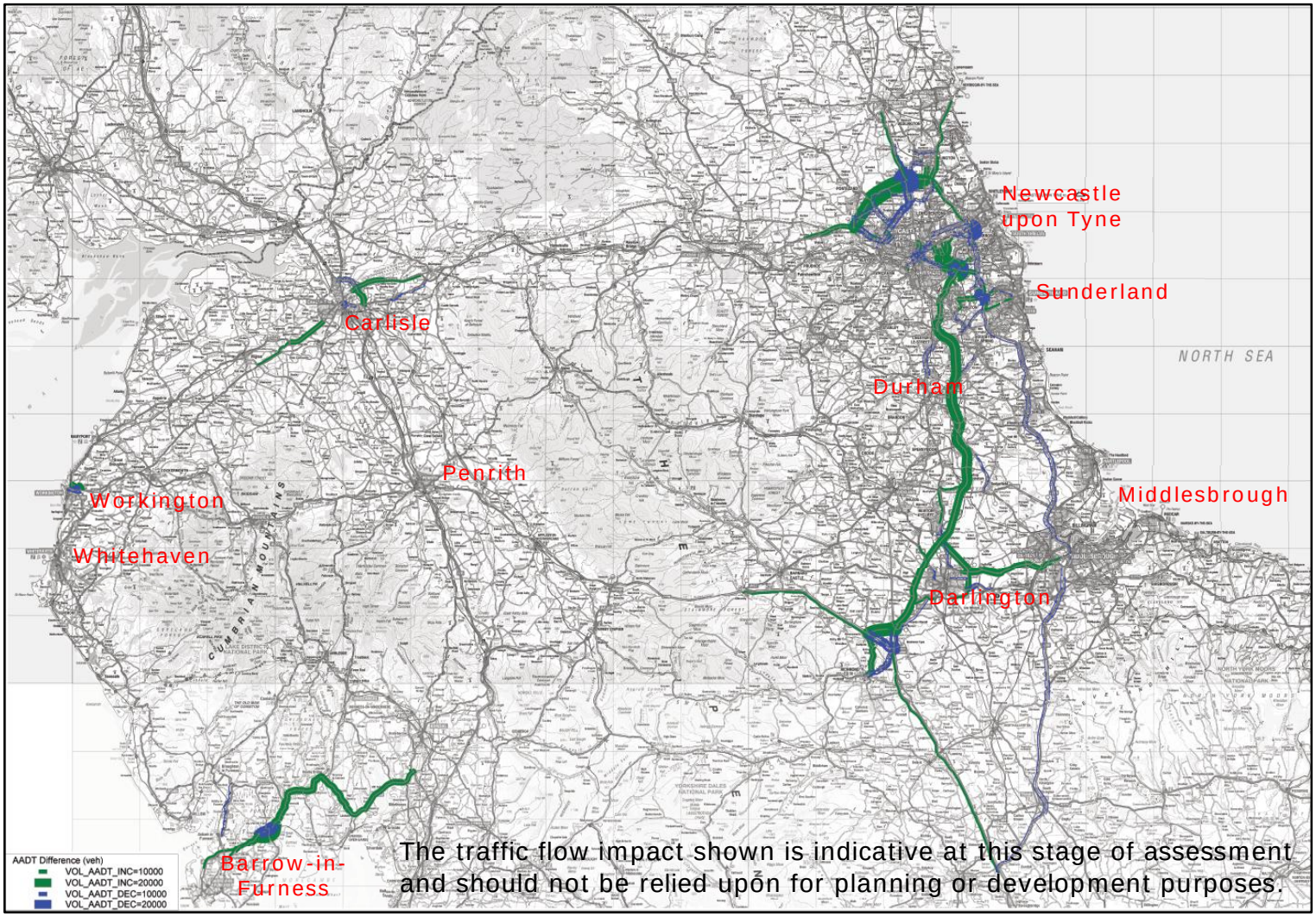
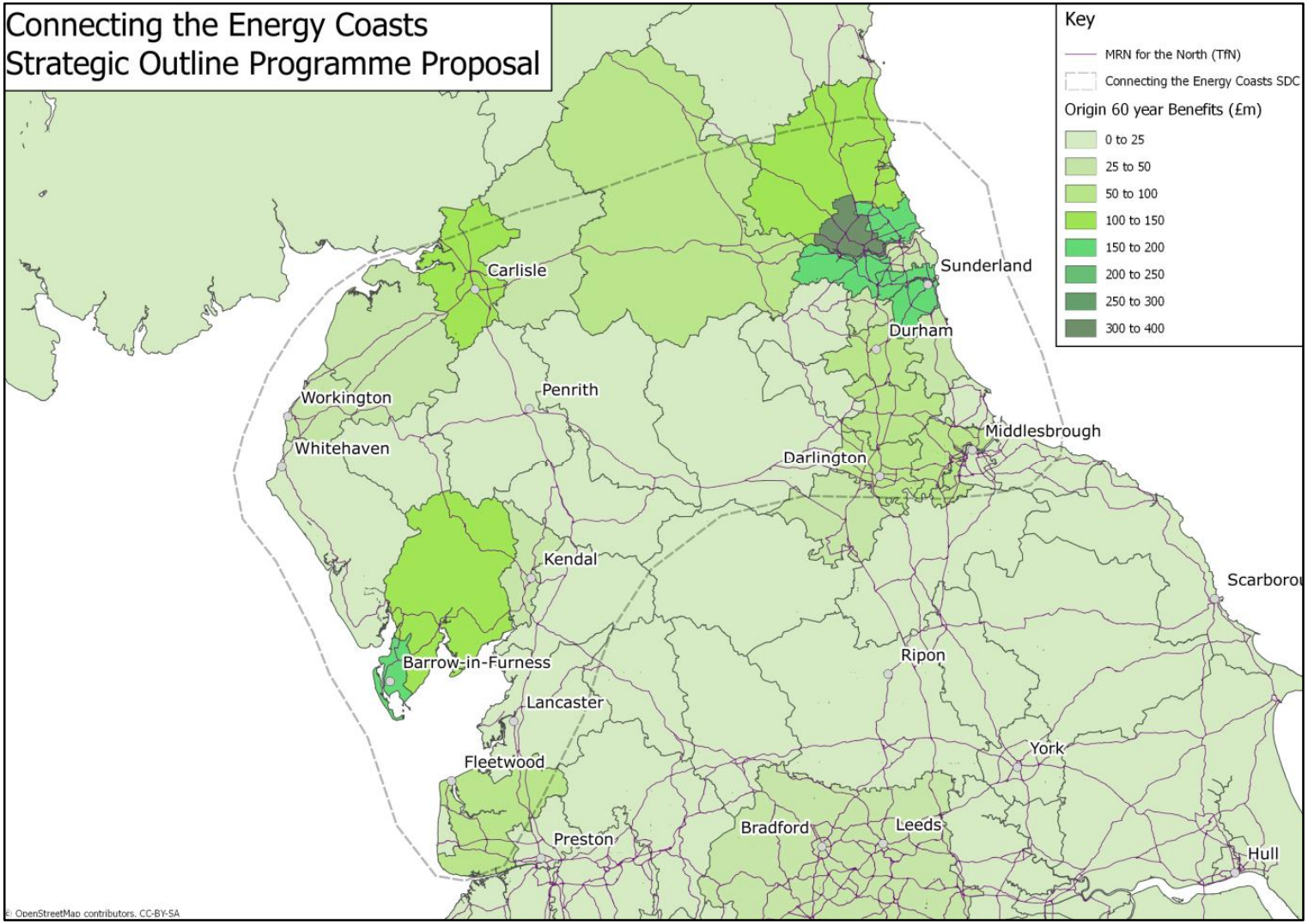


Figure 33 Distribution of Benefits



Approach to Economic Appraisal

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

Level One Established Monetised Impacts

10.11 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 CO_2 emissions

10.12 The Level One monetised impacts include:

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

10.13 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

10.14 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

10.15 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 WSPS'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 Indivative Monetised Impacts

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

Non-Monetised Impacts

10.17 Non-monetised impacts form a key component of assessing the overall value for money of a scheme. For the Connecting the Energy Coast SDC, the following non-monetised assessments have been undertaken:

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

Scope of Economic Appraisal

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

10.19 As presented in Section 15, the overall Value for Money of the Connecting the Energy Coast 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.

10.20 For clarity as to the scope of economic appraisal, Table 14 sets out the monetised and non-monetised assessments undertaken across the three level of benefits.

Table 14 Scope of Economic Assessment for Connecting the Energy Coast SDC SOP

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

	Transport Budget Indirect Tax			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

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 Connecting the Energy Coasts 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 15. Although business users represent a small proportion of the overall trips their high VoT increases the influence on the overall benefits generated.

Table 15 Business User Impact

Business	ALL MODES	ROAD	
User benefits	TOTAL	Good Vehicles	Business Cars/LGVs
Travel time	1,208	615	593
Vehicle operating costs	16	1	14
User charges	29	24	5
Subtotal	1,253	640	613

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

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

Reliability Impact on Business Users

11.5 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.

11.6 Table 16 provides a summary of the estimated reliability impacts on Business Users. Using an approach applied on previous projects and with reference to DfT guidance[51], reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.

Table 16 Business Users Reliability Impacts

	Total
Reliability Impact on Business Users	121

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

Regeneration

11.7 With reference to TAG Unit A2.2, the schemes included in the Connecting the Energy Coasts 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 Connecting the Energy Coasts SDC programme will generate *strong beneficial* regeneration impacts.

[51] Department for Transport, *Value for Money Assessment: Advice Note for Local Transport Decision Makers* (2013)

Wider Impacts

11.8 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 17. 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.

Table 17 Level 2 Wider Impacts Summary

WI1: Agglomeration impacts

	Lower Bound	Upper Bound
Manufacturing	110	39
Construction	28	21
Consumer Services	168	98
Producer Services	201	406
Sub-Total	507	565

WI2: Output change in imperfectly competitive market

Sub-Total	61	61

WI3: Tax revenues arising from labour market impacts

Labour supply impacts	14	12
Move to more / less productive jobs	0	0
Sub-Total	14	12

Total Wider Benefits	582	638

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

Summary

11.9 Table 18 below summarises the Economy impacts:

Table 18 Summary of SDC Programme Economy Impacts

Economy Impacts	
Business user benefits	1,253
Reliability impacts on business users	121

Economy Impacts	
Regeneration	Strong beneficial
Wider Benefits (Level 2)	582 – 638

**Discounted present values, in 2010 prices and values (£m0)*

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 Connecting the Energy Coasts SDC Programme are set out as an Environmental Appraisal Report[52], 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 will 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,

[52] WSP, *Product 17: Environmental Appraisal Report* (2019)

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 will 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 could 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. 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, although this would also have 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_2) 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 2 million tonnes of CO_2 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 fall within or in proximity to National Parks, Areas of Outstanding Natural Beauty (AONB), Heritage Coasts and Dark Sky Reserves, 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 local adverse impacts are considered likely.

Risk appraisal – likely to have significant adverse effects

Townscape

12.10 SOP interventions also fall within settlements and as such have the potential to impact physical and social characteristics of the urban environment that comprise townscapes. The proposed reinstatement of the Leamside railway, and capacity upgrades to the A595 risk local townscape impacts to settlements along their routes. 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 - potential to have significant adverse effects

Historic Environment

12.11 The SOP interventions fall within proximity to a large number of designated heritage assets, including Hadrian's Wall 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 local impacts on heritage assets. However, the SOP does improve access to certain historic and culturally significant sites, including the Lake District and Hadrian's Wall 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 can be 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 its environmental performance.

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 effects on environmental assets of international value, such as the Lake District and Hadrian's Wall World Heritage Site, and several European designated wildlife sites. The SOP would also have potential adverse effects on the landscape characteristics of the Lake District National Park, and several Areas of Outstanding Natural Beauty (AONB). The SOP further has the potential for effects on other designations of national and local value, and adverse effects to environmental resources such as landscape character, ecological networks and the setting of cultural heritage assets.

12.15 With further environmental assessment and option development, and where necessary mitigation and compensation, it is anticipated that these environmental 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 built, historic and natural 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 impacts 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 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, Network Rail Governance for Railway Investment Projects (GRIP) process or local authority or Nationally Significant Infrastructure Project 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 residual 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, Personal Affordability) which are represented within the Economic Appraisal.

Commuting and Other Users

13.2 Table 19 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 19 Summary of Consumer User Impacts

Consumer Users	Private Cars / LGVs
Non-Business Commuting Travel time	670
Non-Business Other Travel time	459
Subtotal	1,129

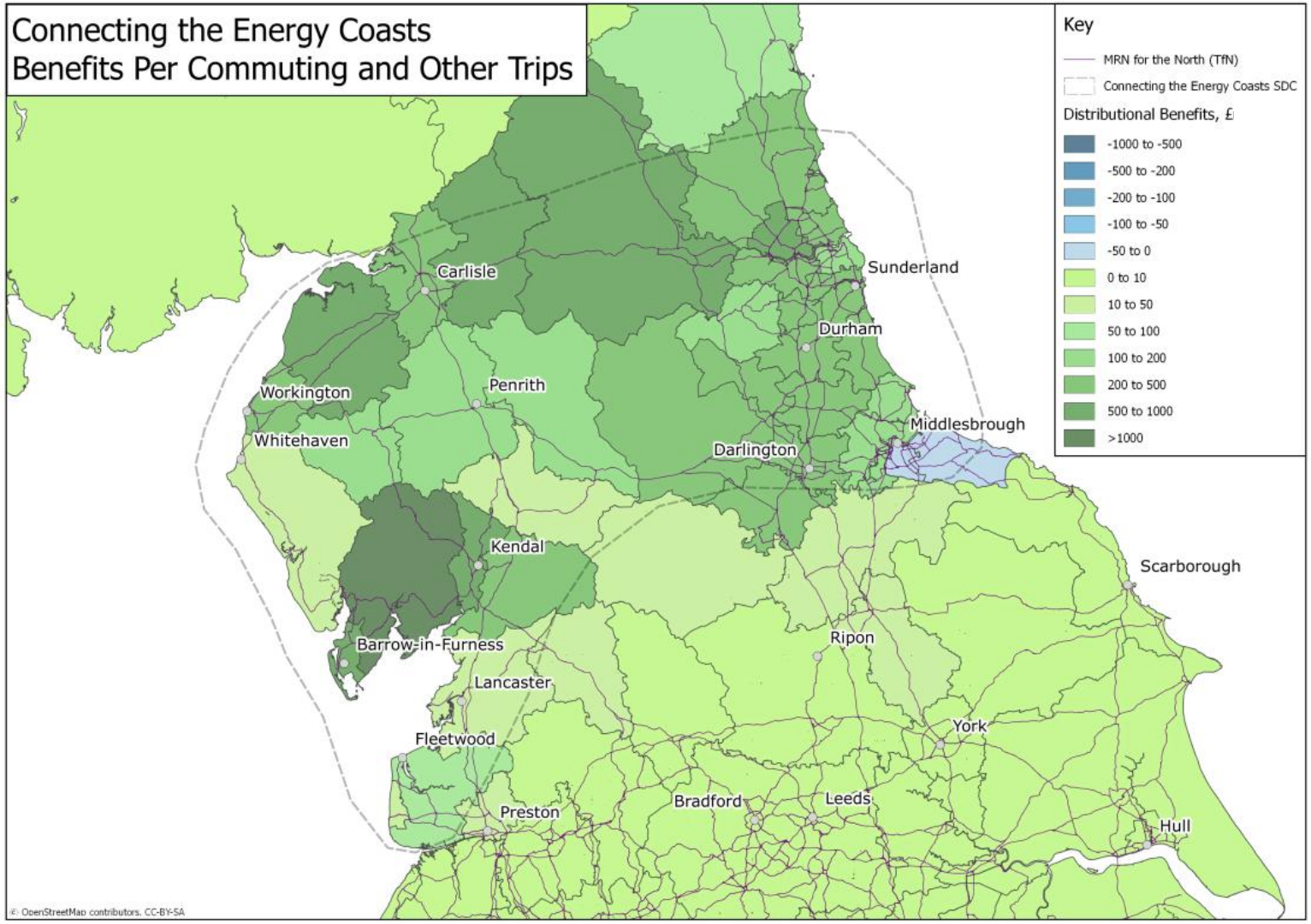
**Discounted present values, in 2010 prices and values (£m)*

Distributional Impacts

13.3 Figure 34 provides a spatial summary of the economic benefits. This considers the distribution of commuting and other benefits divided by the number of commuting and other trips.

13.4 This shows that the level of benefits per trip is well distributed across the SDC area.

Figure 34 Distributional Impacts



Reliability impact on Commuting and Other Users

13.5 Using an approach applied on previous projects and with reference to DfT guidance[53], reliability impacts have been calculated based upon 10% of the travel time savings calculated by TUBA.

13.6 Table 20 provides a summary of the reliability benefits for commuting and other users.

Table 20 Commuting and Other Users Reliability Impacts

Reliability Benefits	Total
Non-Business Users Commuting	67
Non-Business Users Other	46
Sub-Total	113

**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 21.

Table 21 Commuting and Others Affordability

Non-Business: Commuting	
Vehicle Operating Costs	-50
User Charges	28
Sub-Total	-22
Non-Business: Other	
Vehicle Operating Costs	-62
User Charges	37
Sub-Total	-25
Commuting and Other Total	-47

**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 Connecting the Energy Coasts 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

[53] Department for Transport, *Value for Money Assessment: Advice Note for Local Transport Decision Makers* (2013)

and other interests which in qualitative terms is considered to be beneficial from a personal affordability perspective.

13.9 Figure 34 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 Connecting the Energy Coasts SDC 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 22 below summarises the Social impacts:

Table 22 Summary of Social Impacts

Social Impacts	
Commuting and Other Users	1,129
Reliability impact (Commuting & Other Users)	113
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-47
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 Connecting the Energy Coasts 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 Connecting the Energy

Coasts SOP have been derived through a robust cost estimation process, referencing industry standard practice and external independent review.

14.3 For the Connecting the Energy Coasts 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 Connecting the Energy Coasts economic appraisal.

14.4 With reference to the process set out in Figure 31, Table 23 presents the Connecting the Energy Coasts 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 23 DfT's CPSS Cost Proforma Summary Sheet

Item	£m	Unit
Base Cost	2,158	2017 prices
Risk	2,158	2017 prices
OB	2,999	2017 prices
Inflation	5,471	2017 prices inflated to 2034
GDP Deflator	3,461	2010 prices
Market Prices	4,119	2010 market prices
Discounting	1,803	2010 discounted market prices
O+M Uplift (10%)	1,984	2010 discounted market prices
PVC	1,984	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, or mode shift to public transport, affecting the fuel duty received by HM Treasury.

14.6 Table 24 provides a summary of the Indirect Tax Revenues as estimated by TUBA.

Table 24 Indirect Tax Revenue Benefits

Indirect Tax Revenues	ALL MODES
Wider Public Finances	-146

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

Summary

14.7 The relevant impacts are summarised in the form of a standard DfT 'Public Accounts' table for the SDC Programme (Figure 35) under NTEM growth.

Figure 35 Public Accounts Table for the SDC Programme

	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	181
Investment Costs	1,803
Developer and Other Contributions	0
Grant/Subsidy Payments	0
NET IMPACT	1,984
Central Government Funding: Non-Transport	
Indirect Tax Revenues	-146
TOTALS	
Broad Transport Budget	1,983
Wider Public Finances	-146

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

15 Value for Money

Introduction

15.1 A Value for Money (VfM) appraisal of the Connecting the Energy Coast SDC Programme has been undertaken with reference to DfT's Transport Appraisal Guidance[54] as current at May 2018. In this context, Value for Money is a specific, Government-defined, measure of whether it would be justified for public-sector funding to be used for a particular project or programme, for example the SOP.

15.2 This chapter brings together the economic appraisal results for highway interventions within the Energy Coasts SDC, as presented in the preceding sections, and considers their inherent uncertainty, other quantified and qualitative impacts, and distributional impacts. The VfM assessment brings together monetised and non-monetised impacts of the appraised corridor interventions with results from passenger rail and road & rail freight appraisals which have been completed separately.

[54] Department for Transport, *Transport Appraisal Guidance* (2018) https://www.gov.uk/guidance/transport-analysis-guidance-webtag

15.3 The chapter concludes by summarising the next steps for appraising programme level impacts.

Economic Appraisal

15.4 Monetised analyses from the Economic (chapter 11), Environmental (chapter 12), Social (chapter 13) and Public Accounts (chapter 14) impacts set out in this SPOC come together as the Economic Appraisal of the SDC Programme. DfT's BCR represents the ratio:

net-non-transport-budget impacts : net-transport-budget impacts

The latter being represented by the cost to broad transport budget from chapter 14 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.

Transport Economic Efficiency

15.5 The travel time, cost and financial impacts on consumers and the private sector are summarised in the form of a standard DfT 'TEE' table for the SDC Programme (Figure 36) 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).

Figure 36 TEE Table for the SDC Programme (NTEM Scenario)

Non-business: Commuting	
User benefits	
Travel Time	670
Vehicle operating costs	-50
User charges	28
During Construction & Maintenance	0
NET NON-BUSINESS BENEFITS: COMMUTING	648

Non-business: Other	
User benefits	
Travel time	459
Vehicle operating costs	-62
User charges	37
During Construction & Maintenance	0
NET NON-BUSINESS BENEFITS: OTHER	434

Business	
User benefits	
Travel time	1,208
Vehicle operating costs	16
User charges	29
During Construction & Maintenance	0
Subtotal	1,253
Local Authority provider impacts	

Revenue	-70
Operating costs	0
Investment costs	0
Grant/subsidy	0
Subtotal	-70
Other business impacts	
Developer contributions	0
NET BUSINESS IMPACT	-1,183

TOTAL	
Present Value of Transport Economic Efficiency Benefits (TEE)	2,265

**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 (Figure 37) 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 Figure 36)
  - Monetised Environmental Impacts
  - Indirect Tax Revenues (from Figure 35)
- The Present Value of Costs (PVC) equals:
  - Cost to Broad Transport Budget (from Figure 35)

Figure 37 AMCB Table for the SDC Programme (NTEM Scenario)

Noise	Not Monetised
Local Air Quality	Not Monetised
Greenhouse Gases	-82
Journey Quality	Not Monetised
Physical Quality	Not Monetised
Accidents	Not Monetised
Economic Efficiency: Consumer Users (Commuting)	648
Economic Efficiency: Consumer Users (Other)	434
Economic Efficiency: Business Users and Providers	1,183
Wider Public Finances (Indirect Taxation Revenues)	146
Present Value of Benefits (PVB)	2,329

Present Value of Costs (PVC)	1,984

OVERALL IMPACTS	
Net Present Value (NPV)	345
Benefit to Cost Ratio (BCR)	1.17

**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 17; DfT's guidance includes of Level 2 impacts[55] within an 'Adjusted' BCR. DfT's VfM guidance[8] 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 25 sets out the derivation of Initial and Adjusted BCRs for the SDC Programme under the NTEM Scenario.

Table 25 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	2,329	2,329	2,329
Static clustering	NA	507	565
Dynamic clustering	NA	NA	NA
Imperfect competition	NA	61	61
Labour supply impacts	NA	14	12
Reliability	NA	234	234
Present Value of Benefits (PVB)	2,329	3,144	3,201
Present Value of Costs (PVC)	1,984	1,984	1,984
Net Present Value	345	1,160	1,217
Benefit Cost Ratio	1.17	1.58	1.61
VfM Category	Low	Medium	Medium

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

[55] See paragraph 11.8 onwards

Great Britain Level Freight Benefits Appraisal

15.9 The freight benefits of the SOP interventions have been appraised using the Great Britain Freight Model and are reported at a GB and a Northern Level. These cannot be directly added to the highway or rail benefits as the assumptions have been integrated into the modelling approach. However the results do provide a strong indication of the economic benefit of supporting freight growth in the North of England.

15.10 Highway costs associated with delivering the freight benefits within the SOP are captured within the highways economic appraisal. Additional freight scenarios that have been modelled are summarised in Table 26 the benefits of changes to the freight environment in the North of England should the private sector make various investments. These include the ports receiving larger ships, more warehousing and freight being moved by rail. Assumptions for rail freight pathing are based on the current rail delivery programmes and freight re-routing options on 3 alternative diversionary routes. For the results of the freight modelling refer to Table 26 which outlines the different scenarios. These should not be read cumulatively as they are discrete scenarios tested within the Great Britain Freight Model. Further detail on the freight results can be found in the SDC Freight Technical Report.

Table 26 Freight modelling under different scenarios

Scenario	Annual 2035	Annual 2050	Present Value Benefits (2010 prices)		
			Allocated to North	Allocated elsewhere	Total
Benefit of Highways SOP for the North (freight vans)	118	249	3,020	170	3,190
Benefit of Highways SOP for the North (HGVs)	68	89	844	195	1,039
Benefit of re-routing interventions (rail)	309	472	2,213	3,789	6,002
Benefit of removing all other rail freight capacity limits	310	451	1,683	4,080	5,763
Benefit of warehouse clustering	218	479	1,886	3,731	5,597
Benefit of port measures (larger ferries)	231	196	761	1,929	2,690

Appraisal Summary Table

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

Table 27 Comparative Appraisal Summary Table

	NTEM Scenario
Economy Impacts	
Business user benefits	1,253
Reliability impacts on business users	121
Regeneration	Strong beneficial
Wider Benefits (Level 2)	582 - 639
Environment Impacts	
Noise	Moderate Adverse
Air Quality	Moderate Adverse
Greenhouse Gases	Moderate Adverse
Landscape	Likely to have significant adverse effects
Townscape	Potential 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
Social Impacts	
Commuting and Other Users	1,129
Reliability impact (Commuting & Other Users)	113
Physical Activity	Not Assessed
Journey Quality	Not Assessed
Accidents	Not Assessed
Security	Not Assessed
Access to Services	Not Assessed
Personal Affordability	-47
Severance	Not Assessed
Option and Non-use values	Not Assessed
Public Accounts	
Cost to the Broad Transport Budget	1,984
Indirect Tax Revenues	-146

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

Value for Money Statement

15.12 The Value for Money (VfM) Assessment summarises the monetised and non-monetised impacts of the appraised corridor interventions in consideration of whether public-sector funding the recommended SOP would be justified. Highways, passenger rail and road & rail freight, which are undertaken over different geographic areas and cannot directly be summed, are shown separately.

15.13 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

15.14 The appraisal of highway interventions in the Connecting the Energy Coasts SDC is based on the Department for Transport's standard forecasts and completion of Reference Case interventions. 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 £2,329m	Net Cost to the Transport Budget of appraised highway interventions £1,984m	Initial Ratio of Benefits to Costs 1.17
Initial Value for Money Category		Low
Evolving Monetised Impacts (plus wider economic impacts/reliability):		
Established + Evolving Monetised Impacts £3,144 - 3,201m	Net Cost to the Transport Budget £1,984m	Provisional Ratio of Benefits to Costs 1.58 - 1.61
Provisional Value for Money Category		Medium
Non-monetised Impacts A fundamental aim of TfN and Partners is to protect and enhance, where possible, the natural and historical assets of the North. The Energy Coasts 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 to 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. 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 Low Value for Money, in which there can be commensurately higher certainty at this very early stage of scheme development.	
Adjusted Value for Money Category	Low

Appraisal of Passenger Rail Interventions

15.15 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.

15.16 The passenger rail economic appraisal is at a northern level, so includes costs and benefits of appraised rail interventions within the Connecting the Energy Coasts and within the other Strategic Development Corridors. Table 29 summarises the results of the rail appraisal.

15.17 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.

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

15.18 The costs and benefits of the schemes appraised in the Passenger Rail SOP result in an initial categorisation of Low Value for Money. Given that a) these proposals show a strong strategic alignment b) there would be additional material benefits (Evolving and Indicative Monetised) which have not been assessed at this stage of development, and c) there would be non-monetised impacts which are anticipated to be marginal at programme level; no adjustment to the Value for Money category is considered justified.

15.19 The small relative scale of the monetised costs and benefits of the Passenger Rail SOP, in comparison with the SDC highway programme (above), reduces its potential to influence the overall Value for Money

categorisation of the corridors. Taken with the fact that the relative VfM performance of road and rail appraised interventions are broadly similar, no adjustment is justified from the highway scheme categorisation to represent Value for Money for road and rail interventions in combination.

15.20 The approach to assessing passenger rail interventions is detailed further in its Strategic Outline Programme Case document and additional technical reports.

Freight Benefits

15.21 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.

15.22 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)[56]		
	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

[56] Benefits cannot be treated as cumulative or added directly to the assessment of highway and rail benefits

Freight Scenario	Present Value Benefits (£million 2010 prices)[56]		
	Allocated to the North	Allocated Elsewhere	Total
Benefit of Port measures (larger ferries)	£761	£1,929	£2,690

15.23 The approach to assessing freight interventions is detailed further in a separate report available on TfN's website at: www.transportforthenorth.com.

Analytical Certainty

15.24 Transport for the North's Technical Assurance Group (TAG) has reviewed and approved all methodologies employed within the Connecting the Energy Coasts 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.

15.25 The appraisal methodology is therefore considered sound and reasonable for this very early stage of scheme development

Summary of VfM

15.26 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

15.27 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 Long Term Investment Programme, including the sequencing of schemes. The next stage of modelling will include transformational NPIER forecasts and the latest spatial planning information.

15.28 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.

15.29 The reference case assumptions will be updated, so reflect the latest plans for the schemes such as NPR and Trans-Pennine tunnel.

15.30 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.

15.31 As more definitive scheme definitions emerge, scheme costings will be reviewed and the environmental appraisal will adopt the more detailed WebTAG methodologies.

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 Connecting the Energy Coasts 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[57].

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.

17.3 Following the structure of the SPOC documentation, costs for highway interventions are provided for the four separated SDC corridors, whereas

[57] Other general highway intervention costs that would benefit road freight traffic are included within the highway cost assumptions.

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[58]	£14,896	£8,575	£23,471
TfN Programme Level Contingency (5%)[59]			£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 addition, it was presented to the Scrutiny Committee meeting on 30 August 2018, where it was endorsed and recommended for approval by the TfN

[58] Double counting of interventions in more than one SDC removed.

[59] 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.

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 is 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 Connecting the Energy Coasts 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 Connecting the Energy Coasts 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 Connecting the Energy Coasts 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 (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 38 Investment Programme Development Process

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.

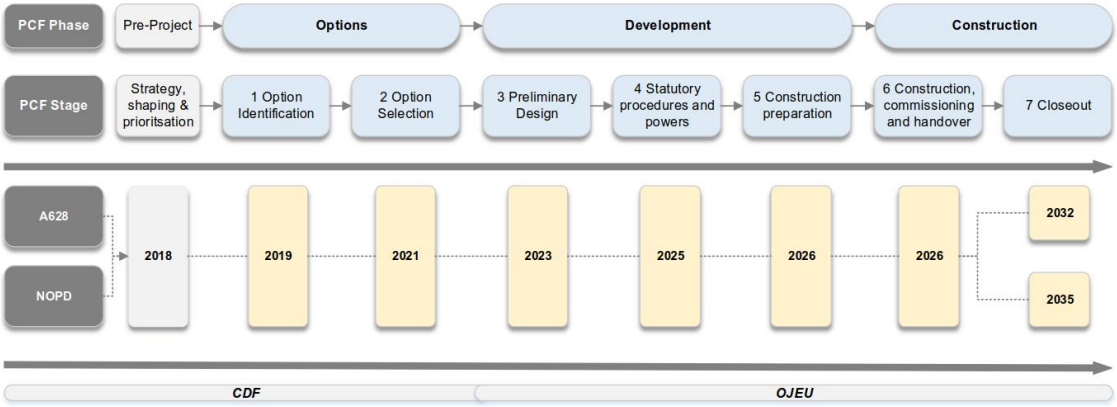
20.23 For complex tenders, TfN regularly invites bidders to Supplier Engagement meetings at which bidders learn about what TfN is trying to achieve, and is

also an opportunity for bidders to input into the Specification and the Procurement tender plan.

Procurement timelines

20.24 Figure 39 illustrates the anticipated procurement timeframes, commencing with further programme refinement and SOBC development.

Figure 39 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[60].

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 Connecting the Energy Coasts 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.

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 Connecting the Energy

[60] Department for Transport, *The Transport Business Cases* (2013) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf

Coasts 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 40.

Figure 40 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 Strategic Programme Outline Case, 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 Strategic Outline programme.

23.14 Through the governance structure TfN will work with partners to review and update TfN's 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)[61] and the Network Rail 'Governance for Railway Investment Projects' (GRIP)[62]

[61] Highways England, *The Project Control Framework Quick Reference Guide* (2017)

[62] HM Treasury, *A short 'plain English' guide to assessing business cases* (2018)

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 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 investments across the Connecting the Energy Coasts SDCs 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, while balancing disruption and the realisation of benefits to the residents of the North of England. The interdependencies with committed schemes such as HS2 and road investments are also a key factor to consider when developing the delivery plan.

24.2 This section presents the emerging delivery programme for the Connecting the Energy Coasts SDC.

Outline Delivery Programme

24.3 The programme of investments proposed for the Connecting the Energy Coasts 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 41 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 Long Term 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 to consider will include:

- HS2
- Great North Rail Project
- Highways England Road Investment Strategy 2 investments (Manchester North-West quadrant, Trans-Pennine Tunnel and Northern Trans-Pennine)
- Northern Powerhouse Rail
- The Borderlands proposition
- 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 Connecting the Energy Coast 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

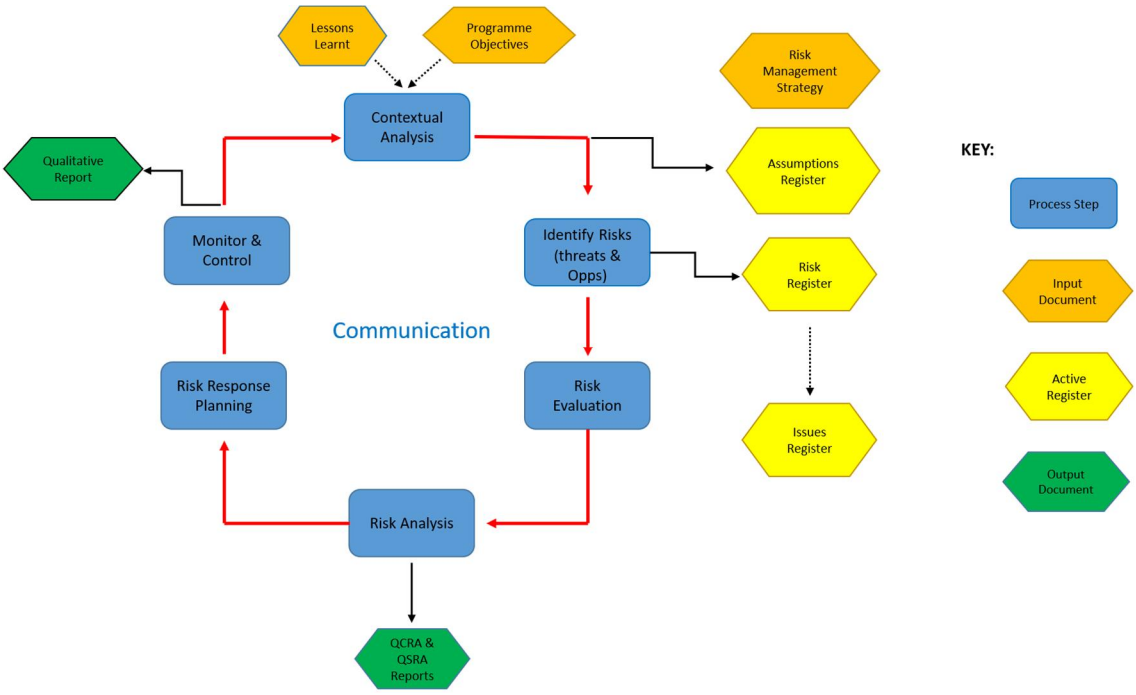
26.3 Collectively, these steps form a logical sequence, necessary for the adoption of a robust approach to the implementation of the risk management with the SDC programme.

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 42 provides an overview of TfN's risk management process. A description of key stages is provided below.

Figure 42 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[63].

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[64], 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[65]. 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.

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

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[63] HM Treasury, *A short 'plain English' guide to assessing business cases* (2018).

[64] HM Treasury, *The Magenta Book* (2011)

[65] Department for Transport, *Monitoring and Evaluation Strategy* (2013)

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 Connecting the Energy Coasts 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.

Glossary

Term	Acronym	Definition
Benchmark		Benchmark Estimating Ltd is undertook the 'benchmarking' exercise on the scheme costs.
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 between1,500 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
Local Enterprise Partnership	LEP

Term	Acronym
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