

Freight & Logistics Strategy

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Executive summary

The freight and logistics sector is a key part of the North of England's economy, both today and in the future. By 2050 it could be worth more than £30bn and employ more than 500,000 people, providing the backbone for economic growth across a range of sectors.

The sector represents a huge opportunity for the region, given that more than 33% of goods enter through the Northern ports, 25% of GB freight starts in the North, and the same proportion of journeys end in the North.

We need to ensure we maintain an efficient multimodal freight network by improving gaps in connectivity. It should be integrated across all modes and is key to delivering our objectives and meeting the needs of industry, the economy, other transport users and the environment. Delivered holistically, this will allow the economy of the North to be more productive, efficient and sustainable while at the same time improving the environment, and the health and wellbeing of our residents.

The aim of this strategy is to undertake an overarching analysis of freight requirements across road, rail, port and inland waterways in the Transport for the North (TfN) region, identify key constraints or challenges on the existing networks, and provide a list of possible areas of work including developing business cases for interventions and policy solutions that

will best support economic growth and decarbonisation.

The strategy also sets out the key objectives for consideration within the context of TfN's activity and role, and articulates key policy positions and those that need development in terms of freight and logistics in our Strategic Transport Plan (STP).

TfN will work with partners, Government, delivery bodies and the industry to deliver the following objectives:

- Reduce the number of incidences of unplanned closures of Major Road Network (MRN) routes leading to severe journey delay;
- Prioritise measures that tackle journey reliability and congestion;
- Support less polluting and more energy efficient movement of goods on the transport network;
- Maximise the utilisation of rail, inland waterways and local distribution hubs to improve efficiency and support the modal shift of goods from road to rail and water;
- Improve multimodal north-south and east-west connectivity across the North;

- Optimise the efficient flow of goods on the MRN and rail network through improved flow of traffic and supported by technology;
- Optimise data availability to support partners in including a freight dimension in building their business cases for transport interventions;
- Support the planning and development of well-connected warehousing and consolidation sites;
- Explore the benefits of regional freight consolidation and distribution networks;
- Reduce the impact of air pollution from freight movements on the health of local communities;
- Reduce the impact of noise from freight movements on local communities;
- Increase electrification of the rail network; and
- Decarbonise road haulage through increased use of zero carbon and low emission fuels.

Freight by road accounts for 90% of all tonnage moved in the North, including first and last mile deliveries. Continuing to improve the network and decarbonise the road haulage fleet is vital in the short to medium term, recognising that the electrification of the rail network will take until 2040 at the earliest.

This strategy provides the underpinning rationale for key road and rail investments included in the TfN Strategic Transport Plan and supporting Investment Programme. These include port-related gauge

enhancements and access for the Port of Hull, Immingham, Port Salford, Liverpool and Teesport, as well as warehousing development sites such as Parkside. Additionally, there is reference to West Coast Main Line (WCML) enhancements and the need for a gauge-cleared route along the east-west axis across the North.

The highways improvement schemes within the TfN STP are needed to enhance strategic connections across the North, and to improve the capacity, connectivity, resilience and access to major conurbations, economic centres and industry and logistics clusters, international gateways and intermodal terminals across the region, in order to support economic growth and competitiveness of the region. These include A1 and M6 connectivity and dualling schemes, port access work both locally to the ports and wider connecting infrastructure such as the A66 and A1079 and river crossings, access to airports such as Carlisle Lake District, Liverpool John Lennon, Doncaster Sheffield and Manchester, as well as M62 improvements which currently connect warehouse clusters and improvements that connect the North to other areas such as the A15 into Lincolnshire and the A19 further afield.

TfN will work with Government, delivery bodies and the industry to ensure that these schemes and programmes are taken forward as part of the Northern Investment Programme, expanding the use of TfN's policy and analytical capability in support of this important agenda.

1. Foreword

Set against the response to the Covid-19 pandemic and other recent economic events, now is the ideal time for Transport for the North (TfN) to set out our stall on freight and logistics. How we support the ongoing delivery of our Strategic Transport Plan (STP)¹ is critical. Our Board has held the industry in high regard throughout the development of the organisation. Having a single document to detail the sector and our focused activity will help industry and Government understand the value that we are adding. In the North, road, rail, inland waterway, air and coastal assets all drive economic growth.

The importance of having the right networks that are resilient and accessible to both people and freight is paramount. The impetus to decarbonise has never been so high. The drive to reduce the carbon impacts of freight and logistics runs through this strategy and works hand in glove with the TfN Transport Decarbonisation Strategy.

We call for a strong, resilient, electrified rail network and certainty on fuelling infrastructure, including hydrogen and battery options on the road network, to support the move to greener transport. The opportunities to access Northern gateways should also be part of this consideration.

Challenge us to push the boundaries and we will work with partners and businesses within the North to underpin change and deliver increased prosperity. Levelling up is crucial to the success of the UK, now more than ever.

The ultimate function of TfN remains to provide statutory advice to Government. We need to be focused on those things where we provide added value and can show outcomes that benefit our region's people and businesses.

Our statutory role and responsibilities remain unchanged and require us to consider the transport system in the round, focusing on:

- Issues and investment proposals that go beyond local authority boundaries;
- Issues that are of common interest and where a collaborative approach enables solutions to be developed and implemented in a timely and cost-effective manner; and
- Influencing and shaping processes and programmes that operate at the national level.

And within that, three key drivers shape the ultimate aims of our work:

- Realising the economic potential of the North;
- Enabling development that is sustainable for the long term; and
- Addressing the extent to which transport acts as a barrier rather than an enabler.

These three themes – economic, environmental, and social – will therefore underpin each of our activities, reminding us why we do what we do. This includes being a strong and engaged advocate for the freight and logistics industry as we progress and develop further as an organisation.

Martin Tugwell
Chief Executive



2. About the TfN Freight & Logistics Strategy

This is the first pan-Northern Freight & Logistics Strategy. It builds on the outputs of our Strategic Transport Plan in developing a multimodal freight strategy for the North of England that can meet the current and future requirements of our region.

The future of the North is rapidly changing. There are widespread demographic changes in population, employment, and economic prosperity. The impacts of Brexit, Covid-19, technological change, future distribution of housing and jobs, changes in our shopping habits, and policies on decarbonisation, will all have a profound impact on the future shape and requirements of the freight and logistics industry.

While these impacts present some uncertainty about future requirements, they also present an opportunity to re-shape the economy of the North to be more productive, efficient and sustainable, while at the same time improving the environment, and enhancing health and wellbeing. Delivering an efficient multimodal freight network, that is integrated across all modes, is key to delivering these objectives and meeting the needs of industry, the economy, other transport users, and the environment.

To ensure that we maximise the performance of our transport network and that it fulfils its potential, it is clear that interventions on the rail network cannot be considered in isolation of the highway network or vice versa. Rail freight is often dependent on road for distribution from rail heads, while removing freight from the Strategic Road Network (SRN), where possible, has widespread benefits for all users.

Building on studies and analysis undertaken by TfN and bodies such as the Department for Transport (DfT), Network Rail, and National Highways, the aim of this strategy is to undertake an overarching analysis of freight requirements across both road, rail, port and inland waterways in the TfN region, identify key constraints or challenges on the existing networks, and provide a list of possible areas of work, including developing business cases for interventions and policy solutions, that will best support economic growth and decarbonisation. The strategy also sets out the key objectives for consideration within the context of TfN's activity and role and articulates our policy positions in terms of freight and logistics.

This strategy covers road, rail, air and waterborne freight linking to port and warehousing opportunities. It is based on an examination of existing policy documents, an extensive survey of existing evidence, workshops held with areas of industry, detailed rail capacity modelling, and further analysis. This is particularly relevant where the modelling cannot address the issues raised in existing evidence.

The three main issues for road, rail and waterborne freight are similar: network capacity and capability, terminal availability, and decarbonisation. In addition, for air, terminal capacity and connections into the transport network are also concerns. For each of the modes however, different policy and investment responses are required.

While most of the responsibility for policy implementation lies with national and local government, TfN operates at a geographical and institutional level that allows us to facilitate a regional approach to assessing measures and research.



TfN is also uniquely placed to assist our partners in the development of business cases using our advanced data and modelling analysis skill set and as such, have shared modelling tools with other sub national transport bodies. This is the way we can help our partners to obtain enhanced evidence, data platforms and intelligence to inform bespoke local and regional strategies in future. This can, in turn, support national policies to take account of spatial and social variation.



3. Why a strategy now?

The North is a place of economic opportunity, renowned for its natural beauty, heritage, culture, and innovation. Transport for the North's ground-breaking economic research, the 'Northern Powerhouse Independent Economic Review'² published in 2016, identified freight and logistics as a key enabling sector to underpin growth in our region. The freight and logistics sector is a key part of the North of England's economy today and will be in the future. By 2050 it could be worth more than £30bn and employ more than 500,000 people.

The North has particular strengths in freight, logistics and warehousing. Reflecting its unique geography, the North is well served by seaports. Immingham – with bulk handling, roll-on roll-off (ro-ro) and lift-on lift-off (lo-lo) capability – is the largest seaport in the UK by tonnage. The North of England also accounts for a substantial proportion of British freight transport, in particular rail, with 56% of total rail freight lifted to, from or within the region.

Combined, the North's logistics assets provide increasingly important capacity for the UK, especially in the context of growing levels of trade entering the UK via ports.

Future investment in the North's transport network must be considered within the context of the UK's productivity challenge, the long-term opportunities for a more inclusive and balanced UK and Northern economy, and, critically, the need for rapid and concerted action on reducing transport carbon emissions.

Decarbonisation has become a global priority. As science and political will converge, greater importance of reducing carbon emissions has been placed on all areas of society, not just the freight and logistics sector. When the STP was published in 2019, decarbonisation had emerged as a key area of activity. Now TfN has grown and developed as an organisation, and with significant Member support, decarbonisation is now a key strategic priority and the TfN Transport Decarbonisation Strategy³ and Freight & Logistics Strategy have been developed together to ensure consistency.

There remains a role for Government to be clear on the ways in which the transport sector achieves decarbonisation. We need to capitalise on a rolling programme of electrification on the railways as soon as possible to ensure that benefits can

be realised by 2045. In addition, TfN supports the work being undertaken around alternative fuel technologies to decarbonise the road freight sector, including the development of battery-electric vehicles that can be statically charged or those that can also embrace overhead charging on e-highways such as the potential trial based along the route from Immingham to Doncaster.

Freight was considered as an integral part of the Strategic Transport Plan published in February 2019. It was informed by evidence from industry and the TfN 'Enhanced Freight and Logistics Analysis'⁴. Following progress made on developing the business case for Northern Powerhouse Rail (NPR)⁵, work on the Strategic Development Corridors,⁶ and the TfN Investment Programme⁷, the next step was to produce a Freight & Logistics Strategy that will enable the TfN Board to agree strategic freight priorities for TfN and then be clear with industry and partners on how to take freight projects and programmes forward. The recent publication of the Government's Integrated Rail Plan for the North and Midlands (IRP)⁸ demonstrates the volatile nature of making decisions in infrastructure



investment. In terms of the freight and logistics sector, the sector's needs will not diminish even if passenger behaviour changes. Therefore, the need for planning interventions to maximise the use of the networks and investments required in future to accommodate growth needs to be carefully planned and considered. This strategy sets out how TfN can articulate that need for the North of England and work with funders on delivering the investments needed.

This Freight & Logistics Strategy has a multimodal focus which means it considers road, rail, air, maritime and inland waterway networks. The nature and profile of the activity at TfN has meant that rail does take up a large proportion of this strategy. This is because work on the Northern Powerhouse Rail business case before the publication of the Integrated Rail Plan, and work of the Rail North Partnership and Strategic Rail team at TfN, is significant. Additionally, the rail freight operators have a well-established set of rights to access the rail network. This means there has to be a significant understanding of freight on the railway and how programmes of investment impact on this, and how we build and sustain the relationships needed to secure the success of the programmes we are championing in the North. The main rail benefit comes from the opportunity that modal shift from road to rail presents in terms of decarbonisation, however the strategy does consider a variety of other methods put forward to achieve a resilient and decarbonised transport network by 2045.

Fully integrating the recommendations of the Williams Shapps Plan for Rail⁹ published in May 2021 is key to securing the modal mix we are striving for. The value of freight services and the access they have to the rail network has been clearly identified.

Great British Railways (GBR) will have statutory duty to promote rail freight and set out how the Government will work with the market to secure investments in the network. In turn, this will offer certainty to the freight market so that investments in engines and rolling stock can be planned at the right place and at the right time. The example of securing investment at Ely in Cambridgeshire will enable the North to gain benefits too by improving access to a rail freight terminal that could result in additional freight trains between the south-east and the North. Our approach to rail investment will always need to be seen in a national context. This is an example where both TfN and Transport for the South East have both recognised the need for investment and have supported this through the Strategic Freight Network Steering Group on behalf of the Sub-national Transport Bodies (STBs).

We will work with GBR and Government as it sets a growth target for rail freight and embeds freight firmly into strategic decision-making. This is a huge step forward but does not diminish our aspirations for sustainable decarbonised road freight growth.



Freight by road accounts for 90% of all tonnage moved in the North. Continuing to improve the network and decarbonise the fleet is vital in the short, medium and long-term. There will be an urgent need for the freight and logistics industry to liaise closely with both local and regional planners to plan network changes that will accommodate the shift to decarbonised streets. This has happened successfully in cities such as Rotterdam and Amsterdam. Consistent education over more than 30 years and planned changes to road layouts over time have enabled greater and safer cycle usage and integration in the cities.



3.1 Key objectives

The key objective of the Freight & Logistics Strategy is to accelerate our Investment Programme interventions that would best support the strengthening of the North's economy. Crucially, it also seeks to set out how TfN can support the freight and logistics sector to decarbonise. We have already published our Transport Decarbonisation Strategy which sets out the trajectory towards zero carbon, however it is clear that to achieve decarbonisation we need to:

- Explore and implement alternative fuel technologies for road transport;
- Support further electrification of the rail network;
- Call for and support the creation of additional terminals on rail and inland waterway networks to encourage modal shift from road to rail and water where possible;
- Address capacity and network issues on the rail and inland waterway networks to encourage mode shift from road to rail and water where possible.

Additionally, we need to identify the policy positions TfN needs to develop to deliver the strategy effectively, which will inform the review and revision of the Strategic Transport Plan and Investment Programme.

The strategy also is mindful of the fact that the North plays an important role in the transit of goods throughout the UK and not just to and from the North. Key routes through the North between the South of

England and Scotland and Wales, for example, are important to ensure the economic performance of the UK. The strategy therefore takes into account and supports the findings of the Government's Union Connectivity Review (UCR).

Set in the context of the Northern Transport Charter (NTC) ambitions of championing an inclusive and sustainable North, securing a long-term Northern funding settlement, putting the North's rail passengers first, and leading strategic transport delivery, this strategy will move the debate forward on supporting the ambitions that will enhance the North's economic strength and ambition.

3.2 Freeports

The 2021 Budget announced the locations of eight freeports in England. The Freeports of Humber, Liverpool City Region and Teesside are in the TfN area. The benefits of the other freeport arrangements further south will be felt within the North as the other freeport areas play a significant role in the economy of the North by trade activity.

Where the ports of the North have not been awarded freeport status, we will continue to champion the infrastructure needs and any development opportunities that sits within TfN's remit. The Government's approach to freeports is that they generate opportunity for economic growth. We do not want to see the decline of other port activity if companies are indeed swayed to move to such a port by the tax and other economic benefits freeports offer. This is an issue we will watch with great interest.

We also note that at the time of publication, freeports at Teesport, Humber and in London are progressing and are indeed launched. This is an exciting development and as they develop further we will build relationships with the teams operating them and ensure we continue to capture their wider infrastructure needs in our work.

3.3 Importance of the freight and logistics sector in the North

In 2016 Transport for the North published the ground-breaking Northern Powerhouse Independent Economic Review. The review identified that the GVA in the North was 25% below the national average, which is a significant gap in productivity. This meant that there was an opportunity to articulate the need for investment in the North in a different way – to maximise the productivity of the whole of the UK which would contribute a stronger economic offer for UK PLC.

The prime economic sectors of advanced manufacturing, health innovation, energy, and digital were identified as key to the North's success. To support these sectors, freight and logistics was identified as an enabling sector, alongside finance and professional services, and education. This identification of freight as a key enabler was the catalyst for the work on freight and logistics at TfN and the networks and investment needed in the North to close the productivity gap.

The review also identified that it was not the lack of diversity of sector activity in the North but that the difference in productivity within each sector that matters more. There was also a lack of business-to-business sharing and development of

expertise. While this is not fixed easily, as relationships develop across TfN programmes we can be a catalyst to help change this position.

The freight and logistics sector activity in the North is significant. With high levels of major port and warehousing activity and the clear desire articulated by TfN Members to see the networks strengthened to support the growth of these areas, TfN invested heavily in understanding the pan-Northern impact of the sector. This gave freight and logistics prominence in strategy development and the publication of the Enhanced Freight and Logistics Analysis supported the development of the Strategic Transport Plan.

Northern Powerhouse Independent Economic Review

The 2016 Northern Powerhouse Independent Economic Review (NPIER) identified freight as one of the North's key enabling capabilities, playing a vital role in delivering transformational economic growth across the region. This transformational growth will deliver an additional £100bn in GVA and an extra 850,000 jobs in the North by 2050.

The past experience in the logistics sector has been growth at a slightly faster rate than in the wider economy. The sectoral composition of the North in a transformational growth scenario implies trends that both reduce and boost the demand for logistics: lesser importance on heavy freight imports and exports (and for the future a greater reliance on more sustainable modes, notably rail and water-borne) and supply chain imports associated with those sectors; greater importance of imports of consumer goods and high-value (including air) freight. Under the transformational scenario, the net effect of these changes are assumed to keep the logistics sector's growth above that of the Northern economy, while productivity growth within logistics in the North is assumed to be at a similar or slightly faster rate than in the UK economy as a whole.

Following on from the publication of the STP and Investment Programme in 2019, freight requirements have been a key consideration within TfN's Strategic Development Corridors and subsequent work on the Investment Programme Benefits Analysis (IPBA).

Given its high-profile nature and the additional importance of decarbonisation and how the themes interact, it is timely to see this strategy published and ensure the sector itself, Northern leaders and Government, clearly understand and appreciate the Northern priorities we identify and wish to see delivered.

In April 2019, the National Infrastructure Commission published evidence drawn together by Vivid Economics in the Value of Freight report¹⁰. They reported that "the cost of the UK freight system is equivalent

to around 4% of GDP. We estimate that the UK spends up to £80bn per year on road freight, rail freight and warehousing. Of this, road freight accounts for around £38bn; rail freight for around £1bn; and warehousing for £20-38bn. Labour costs make up around one-third of road freight and warehousing costs."

The sector represents a huge opportunity for the North given that more than 33% of goods enter through the Northern ports, 25% of GB freight starts in the North, and the same proportion of journeys end in the North. However, there is some evidence that constraints in the freight network, nationally, cause inefficiencies. These include a shortage of warehouse capacity (especially rail connected warehousing), the inability of rail to carry containers east-west across the Pennines or elsewhere in the North, and the disproportionate

reliance on the ports in the South (even when roll-on roll-off traffic is excluded). This is because the North's rail network cannot fit the containers on it as the tunnels and bridges are not big enough in places. This is known as 'gauge clearance' and the North would like to see the largest gauge, W12, being delivered on the network where possible.

By taking a multimodal approach and using demand information generated by the modelling and analysis tools developed at TfN, we can consider capacity constraints on the whole network. In terms of road and rail there will be consideration of the importance of well-connected terminals that feed the warehousing clusters of, for example, Warrington in the North West and Wakefield and Doncaster in the east, all of which are constantly evolving and securing new business.

3.4 TfN Future Travel Scenarios background

TfN's Future Travel Scenarios (published in December 2020)¹¹ apply a comprehensive consideration of the economic, environmental, social, spatial, and technological future uncertainties which will influence how people, businesses, and goods interact with the transport network in the future.

The Future Travel Scenarios highlights various factors that are external to TfN's direct control, acting as 'reference cases' with which we can test the performance of TfN strategies and policies in pursuing our vision and objectives across different scenarios. The factors explored during this work are categorised as:

- 1 Growth in the population and economy;
- 2 Spatial planning policy and economic distribution;
- 3 National policy on environment and sustainability;
- 4 Technological change and advancement; and
- 5 Social and behavioural change.



Our approach opens up these factors and their complex interactions with travel demand and land-use, with the aim of inserting them into the heart of our long-term planning and decision-making. This enhanced understanding provides a mechanism to help ensure we are robust, resilient and agile to wide-ranging and cross-sector uncertainties, and we can approach future uncertainty with confidence.

The Future Travel Scenarios were developed in partnership with Local Authority partners, national delivery partners, and academic experts, and informed by local strategies and priorities.

Our Future Travel Scenarios will form an integral part of TfN's decision-making processes. In conjunction with our Analytical Framework and Appraisal Framework, they will be used to test and refine TfN transport strategies, policies and programmes so that we support transport interventions, solutions and policy measures that meet our objectives across a range of futures

Our four TfN Future Travel Scenarios are summarised below:

Just About Managing

What if society continues to develop in line with existing trends?

→ This scenario sees a state of inertia, although this should not be taken as neutral. It sees a future where people do not alter their behaviours much from today, or give up certain luxuries, although there is a gradual continued trend towards virtual interaction. Economic growth continues at a moderate rate, but it is largely consumption-led and unequal, lacking agility and vulnerable to shocks. This scenario is led by markets, without much increase in political direction, with its biggest driver being economic

→ This scenario sees a future where digital and technological advances accelerate, transforming how we work, travel and live. In general, we embrace these technological changes and the move towards a distributed, service-based transport system. Long-term climate change targets are met, but there is slow progress in the short-term due to a general preference for individualised mobility over traditional public transport. This scenario is led by technology, with the biggest drivers being technical advances and a willingness to embrace mobility-as-a-service and shared mobility in the long-term.

Digitally Distributed

What if society achieves NPIER outcomes by using technological solutions to create connection and agglomeration across towns and cities?

Prioritised Places

What if society becomes more focused on place, place-making and community than growth or connectivity?

→ This scenario sees a significant shift in political and economic direction to ensure that no place is left behind. Every area, including cities, towns and rural and coastal areas, has a bespoke local economic strategy, supported by investment in local assets, specialisms and economic and social infrastructure. Community, localism and place-making across the North is applied to build a sense of local identity to improve local economies. There is a focus on work-life balance and social equity within and between places. This scenario is led by a change in priorities, with its biggest driver being the push for a fairer redistribution of economic prosperity.

Urban Zero Carbon

What if society achieves transformational growth outcomes by using policy intervention to maximise energy-efficient city growth?

→ This scenario sees a significant shift in public attitudes towards action on climate change, and strong national Government response to meet it. There is a boost to economic productivity to levels consistent with the NPIER, primarily through a combination of urban agglomeration and place-making. Transport users demand and embrace publicly available transit and active travel options, as there is a blurring of the line between 'public' and 'private' with increasing shared mobility systems online. This scenario is led by attitudes to climate action and urban place-making, with the biggest drivers being strong Government policy and trends of urban densification.

TfN's Future Travel Scenarios Report¹² provides a comprehensive overview of the process undertaken to develop the new Future Travel Scenarios. It also delves into the contextual factors underlying each scenario, resulting stats and figures, and explores the expected implications of each future state.

4. The North's freight and logistics network

The North of England's transport network is extensive and encompasses rail, road, inland waterways, sea and air infrastructure in addition to a significant volume of warehousing, particularly around Liverpool, Manchester and Leeds.

The transport infrastructure supports a Northern population of more than 15.5 million people¹³, and, prior to the impact of Covid-19, some 7.4 million jobs¹⁴. It covers more than 38,000 square kilometres of land¹⁵ and contributes more than £364bn GVA towards the UK economy¹⁶.

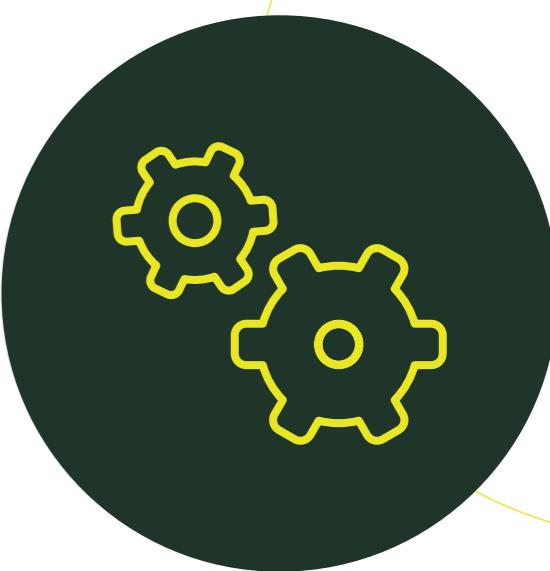
Freight accounts for 9% of the country's GDP and supports every industry with access to goods and services. In the UK, a total of around 1.65 billion tonnes of freight are lifted by all modes per annum. Over a third of freight tonnes lifted comes from the Northern ports, covering both international and domestic traffic.

The North boasts a wealth of freight assets that grant the region a strong multimodal freight capability. These include:

- 11 major ports (three with provisional Freeport status in the Liverpool City Region, on the Tees, and the Humber) in addition to other ports located on the Tyne as well as in Lancashire, Cumbria and Northumberland;
- Seven international airports including Liverpool John Lennon, Leeds-Bradford, Doncaster-Sheffield, Humberside, Durham Tees Valley, Newcastle, and Manchester, in addition to the domestic airport located at Carlisle Lake District;
- Three Strategic Rail Freight Interchanges (SRFIs – distribution centres with intermodal terminals) at Ditton, Wakefield, and Doncaster, with more emerging;
- Three further Intermodal Terminals at Trafford Park, Leeds and Garston;
- A Strategic Road Network focused on the M62/M60/M56 and A66/69 east-west corridors and the M6 and M1/A1 north-south corridors;

- A strategic rail network principally comprising of the West Coast Main Line (WCML), East Coast Main Line (ECML), and Midland Main Line (MML), that connect the North of England to the south and the Transpennine routes; and
- A significant amount of distribution centre land use with more required.

Despite these assets being available, many are not being fully utilised due to several reasons such as lack of joined up infrastructure or attractive alternative logistics solutions. Gaps in connectivity prevail that urgently require investment; 80% of road freight in the North is domestic traffic, most of which is short haul (making it difficult to justify the use of rail on commercial or efficiency grounds), which places a heavy burden on the SRN.

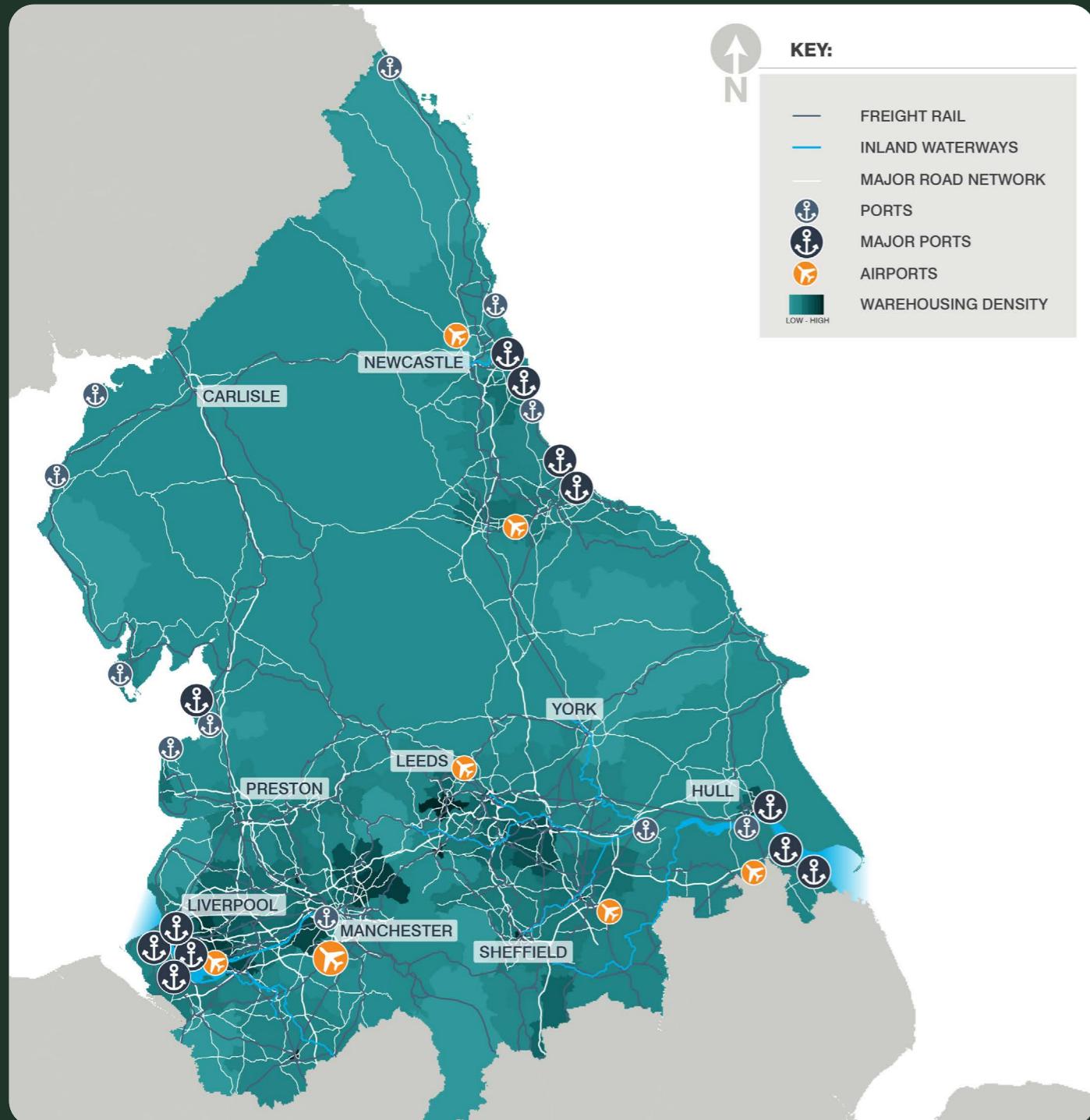


4.1 The North's multimodal freight flows

The North's freight traffic is carried by road, rail, waterway, and air. Inland waterway and air carry very small percentages of overall volumes in the North. TfN recognises that there are opportunities as outlined above.

The key transport infrastructure in the north of England is presented in the map

Figure 1: Key transport infrastructure - North of England



The UK handles large volumes of imports and exports at various seaports. There are three major port clusters in the North of England: Liverpool, Hull and Immingham, and Tyne and Wear. These ports generate traffic to and from inland terminals and warehouses within the North and beyond. These tend to handle short-sea traffic. In addition, large volumes of freight destined for the North comes from the major deep-sea ports in southern England: Felixstowe, Southampton, and London Gateway.

The other generators of freight traffic are inland distribution centres, terminals, and warehouses. These are scattered across the country for onward distribution to end customers (such as retailers, households, or business users of commodities such as construction sites and factories). In the

North, areas of high warehousing density are usually urban clusters, particularly around Manchester, Liverpool, Leeds, and the wider Yorkshire region.

Main commodity groups carried by road and rail freight include:

- Intermodal container
- Construction
- Metals
- Automotive
- Petroleum
- Foodstuffs and household delivery

Key flows	Main rail routes	Main road routes
North-South	WCML (Crewe – Carlisle) ECML (Doncaster – Newcastle) MML (south of Sheffield)	M6 A1 (M) (especially York and Newcastle) M1 (south of Sheffield)
East-West	North Transpennine Line (via Diggle) Calder Valley Line (via Rochdale) Copy Pit Line (via Burnley) Hope Valley Line (via Edale)	M62 (between Liverpool and Hull) A69 (between Carlisle and Newcastle) A66 (between Penrith and Scotch Corner)

All the listed north-south routes are very busy across both road and rail, carrying traffic to/from or within the North, and significant Anglo-Scottish traffic (much of which moves through the North). The WCML and M6 both carry very high freight volumes south of Warrington.

For east-west traffic, there is currently relatively little rail traffic. There is at present no gauge-cleared route suitable for container traffic. The small number of trains that run are for construction aggregates and biomass.

The busiest east-west road corridor for freight is the M62. The A69 and A66 also play an important strategic freight role, offering strategic links to Scotland and ports. Reflective of this; they carry lower volumes of traffic overall. However, HGVs and LGVs account for a large percentage of overall traffic on these routes making them a key route in the North for freight. The A616 and A628, which provides a route to Manchester known more popularly as Woodhead Pass, can be affected on multiple occasions throughout the winter. Due to the Pennines topography, these are the only main east-west routes with a lack of suitable alternatives and are susceptible to disruptions.

The choice of road versus rail for freight is typically driven by cost. This cost evaluation needs to take account of both haulage costs and indirect costs such as the construction of terminals. Using rail typically involves building a rail terminal which is often larger and more costly than the road equivalent, and where that is the case, the operator will need to include these (extra) capital costs in their calculations.

Road haulage does have typically high economic costs in terms of pollution, highway damage, congestion, and noise. The actual body that pays for these costs ends up being the Highway Authority and not the haulier. In rail terms there are fewer costs absorbed by Councils and more absorbed by the freight operator. This is why the Freight Facilities Grants run by DfT were popular.

Historically, bulk cargoes such as construction materials and coal for power stations have been the main commodities of rail. Coal has declined with the shift in power generation to renewables and the earlier “dash for gas”. Until recently, other heavy industries had not filled the gap left by coal. In part that is because there is less

heavy industry in the UK economy, but it is also because of the gradual shift in power generation. Where offshore wind has grown, the infrastructure required is port-side and near the shore.

This in effect removes coal’s primary need for rail freight. Construction materials continue to be moved across the UK with the importance of the quarries in the Peak District and Yorkshire Dales in particular increasing. With the limit of lorry movements restricted by the Peak District National Park, the train loads of aggregates have almost doubled. Where around 2,400s tonne of aggregates left the Peaks to Wembley twice a week, now one train of around 4000 tonnes works now. This is a huge argument for the attraction of modal shift and highlights the industry’s long-held belief that moving more on bigger trains is possible – even on paths that were designed for much lighter trains.

However, increasingly with the rise in volume of consumer goods and specialised manufacturing (in the UK and globally) and with more rail-served warehousing sites, with terminals built across the country, the total volume and the proportion of intermodal containers and fast-moving consumer goods travelling by rail has also risen. This trend is expected to continue.



Within any one commodity group the comparison of road versus rail costs will vary by journey:

- **Distance:** Because road costs per extra kilometre are higher than rail costs per extra kilometre, rail is typically more viable (higher mode share) over longer distances than over short distances.
- **Cargo quantities:** Rail is normally not well-suited to small cargo volumes because it takes some time to build up enough freight to warrant running a train. This leads to infrequent and large deliveries (often inconvenient for the customer) and can lead to under-utilised railway assets.
- **Rail-connected:** If there are rail terminals at both the cargo generator and the cargo consumer, then this removes the need for a local road haul between cargo generator/consumer and rail terminals – thus significantly reducing the costs of using rail.

It is often difficult to define mode share by commodity because commodity definitions between modes are often difficult to harmonise.

4.2 The North's road freight network

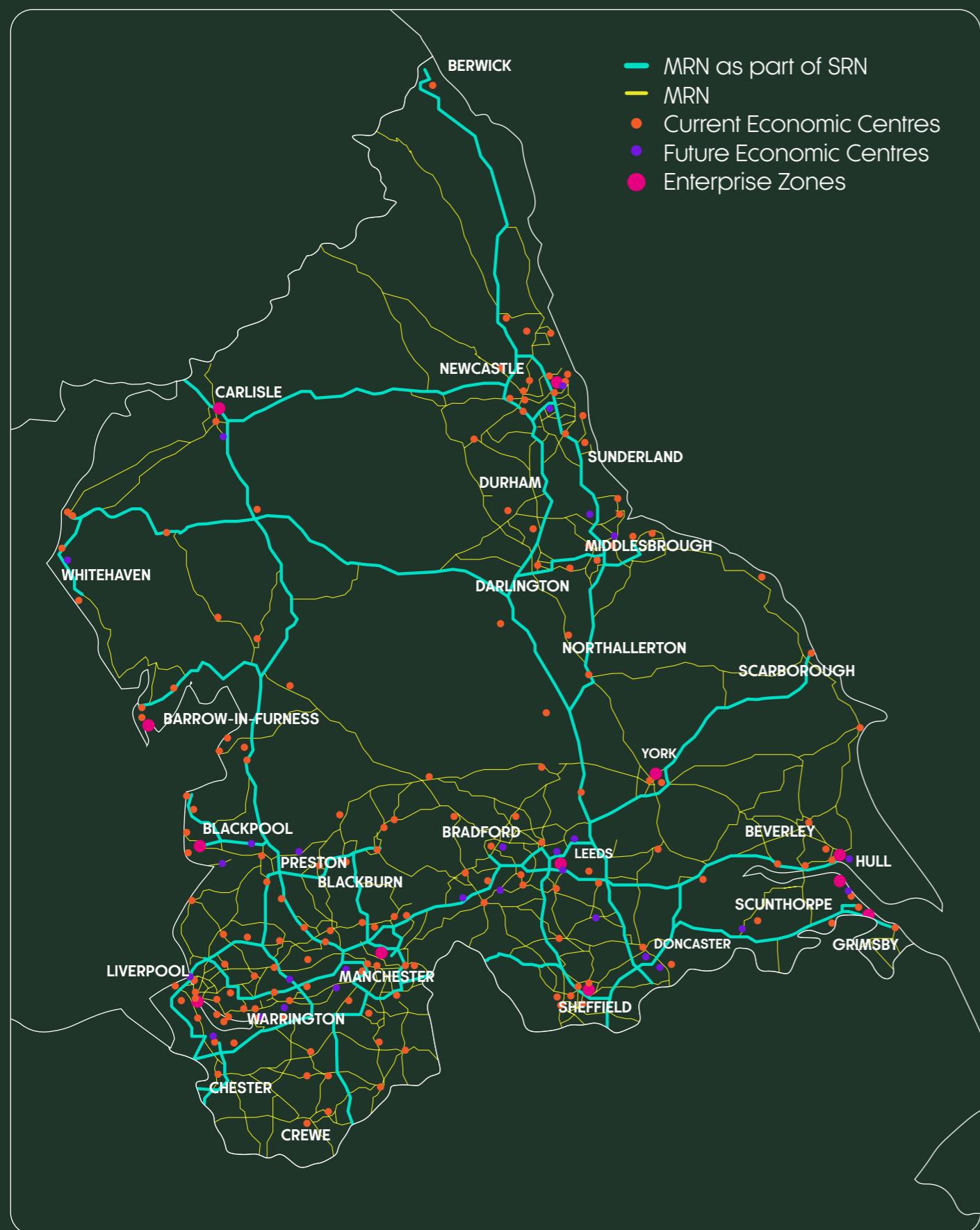
The Strategic Road Network (SRN) in the North of England covers many of the region’s large economic centres. North-south routes are provided through the M6 between Carlisle and Rugby, providing a vital link through the west of the region, and the A1 (M) between Newcastle close to Doncaster through the east of the region. The M1 links Leeds to London and provides a key route into and out of the North.

East-west routes are provided primarily through the M62 as the central corridor between Liverpool in the west and close to Hull in the east.

Additional routes include:

- M56 between Manchester and the Welsh border near Chester;
- M58 between the M6 at Wigan to the north of Liverpool close to the port;
- M57 links the M58 and M62 and provides an eastern bypass to Liverpool;
- M53 links Liverpool to the M56 via the Wirral;
- M60 forming the Manchester Ring Road;
- M65 between Preston and Colne;
- M18 links the M1 near Rotherham to the M62 to the west of Goole;
- M180 connects the M18 north of Doncaster to the A180 west of Grimsby and Immingham;
- A628/A616 is the main strategic freight route between South Yorkshire and Greater Manchester;
- A69 links Carlisle and Newcastle;
- A66 provides a strategic route between Penrith (M6) to Scotch Corner on the A1 (M); and
- A59 between York and Liverpool.

4.2.1 Figure 2: Major Road Network in the North



While total traffic volumes are greatest on roads operated and managed by National Highways, known as the Strategic Road Network (SRN), this only accounts for 2% of the road network in the North. Almost all road journeys start and finish on local roads, including those first and last miles of a journey that can make all the difference as to whether goods or people make it in time and as efficiently as possible.

In response to this issue, TfN and its constituent authority partners have identified and mapped a Major Road Network (MRN) for the North - a network consisting of the North's economically important roads. This network, which includes both the SRN and important local roads, represents about 7% (by distance) of the roads in the North, and links the North's important centres of economic activity, including the first and last miles to and from the SRN.

The North's major centres of economic activity include:

- Ports and airports, supporting imports, exports, and the visitor economy.
- Clusters of the prime and enabling capabilities as defined in the Northern Powerhouse Independent Economic Review.
- Major population centres, which are generally more than 50,000 residents.
- Enterprise zones, universities and other key employment sites.
- Major centres of tourism.

There is a direct link between better connectivity to these assets and enabling the North's economy to realise its potential.

The MRN¹⁷ has a critical role in connecting people, businesses, and communities, and put simply, major roads are indispensable to supporting economic activity, access to services, and our overall quality of life.

4.2.2 Road issues

The key considerations for the network include capacity to accommodate all the forecast growth on the network and any constraints this then highlights. The reliability and resilience of the network is also challenging with the ability to recover from planned and unplanned events critical to the economic success of the North as a whole.

Key areas of the highway network where constraints impact road freight include the east-west Trans-Pennine movement on the M62 and its links into other key routes such as the M60, the A616-A628-M67 between South Yorkshire and Greater Manchester which is mostly single carriageway and suffers from severe congestion particularly around the approaches to the M67, and the A66 from Tees Valley to Penrith – particularly vulnerable to weather conditions and the subject of a major programme of investment led by National Highways. North-south connections on the M1 around Sheffield, A1 West of Doncaster, A1 Newcastle - Gateshead Western Bypass, the M6 in Cheshire and Warrington, and the A19 in the Tees Valley and North East. The pinch point occurs at the Tees crossing which requires investment and has a clearly articulated and well understood business case.

Other areas of investment with significant

freight benefits include access to ‘constrained’ ports, for example the A5036 to the Port of Liverpool and A63 to the Port of Hull, both schemes within the National Highways Road Investment Schemes (RIS)2 programme; road and rail access to Parkside in St Helens, and schemes being considered within the RIS3 pipeline, for example A1 Doncaster – Darrington and M1/M62 Lofthouse Interchange.

In terms of freight connectivity, the access to and from intermodal terminals for example at Trafford Park, Leeds, Garston, Doncaster iPort Rail and Widnes, and international airports, particularly Manchester and Newcastle, also requires attention. Most of these areas are particular examples where a pan-Northern view on the investments needed are helpful in developing business cases for investment.

Linked to the topic of decarbonisation are the concerns around air quality in major urban centres. Clean Air Zones (CAZ) with targeted actions to improve air quality and reduce significant levels of air pollution have been proposed in Greater Manchester, Leeds, Bradford, Newcastle, and Sheffield. There is a push to consider different ways of making deliveries in urban areas using e-cargo bikes and zero emission vehicles (ZEVs) as an example. This can be difficult as the road infrastructure needs to meet the needs of all vehicles. Where cities across Europe have embraced the benefits of more localised deliveries, it is built upon decades of policy change and spatial planning policy development that delivers infrastructure to maximise the benefits to the zero-carbon road user rather than the petrol or diesel vehicle. It is also worth clarifying that there will always be a role for lorries and rail services to bring goods into city centres to restock shops and

other establishments. One lorry can carry the equivalent of 20 van loads so larger lorries can indeed be better in some circumstances.

Road will remain the main modal choice for freight due to the existing popularity of the network, ease of access, lack of rail capacity, and the long timescales and high costs associated with creating new rail capacity. Having said this, we would expect that after 2040 a greater percentage share of freight will be carried by our rail network. Reflecting this, TfN’s Transport Decarbonisation Strategy has targeted rail traction decarbonisation in the North by 2040 (in line with Network Rail’s Traction Network Decarbonisation Strategy).

Our decarbonisation target of near-zero emissions from surface transport by 2045 means that the road fleet needs to be decarbonised by then too. The route to decarbonising our road freight vehicles is still unsure, although is likely to be a mix of hydrogen and battery electric solutions including on-road charging where appropriate. TfN’s Transport Decarbonisation Strategy has laid out several recommendations to expedite the decarbonisation of our road freight, including the testing and trialling of new vehicle and refuelling technologies in the North, data democratisation (that is, making fuel/driving efficiency data available to all) and the aggregation of zero emission vehicle orders to prove a market for vehicle manufacturers in the North.

Another issue the road freight sector is facing is the shortage of HGV drivers. This has been a longstanding issue due to a range of factors such as an ageing workforce, the attractiveness of the job, and political issues. Work needs to be

undertaken to improve the perception of a job in road freight haulage and improve conditions through less congested roads, and more lorry parking with better overnight security and facilities.

4.3 The North’s rail freight network

The North of England has an extensive rail network, including faster main lines, more rural branch lines, and freight-only lines into and out of ports.

The main north-south rail routes include:

- West Coast Main Line (WCML) from Scotland/Liverpool and Manchester to London Euston through the North of England via Crewe;
 - East Coast Main Line (ECML) from Scotland/Newcastle/Leeds/Middlesbrough/Hull/York/Darlington to London Kings Cross through the North of England via Doncaster; and
 - Midland Main Line (MML) from Sheffield to London St Pancras.
- There are also several other routes throughout the North of England which are used for the movement of freight. There are others which have the capability but lack the capacity or space needed to fit additional trains on.

The current routes used include:

- Diggle Route from Manchester to Leeds via Stalybridge and Huddersfield;
- Calder Valley Route from Manchester to Leeds via Rochdale, Halifax and Bradford;

- Hope Valley Route from Manchester to Sheffield via Marple and Chinley;
- Leeds to Carnforth via Wennington;
- Leeds to Carlisle via Settle and Appleby;
- Blackburn, Hellifield, to Carlisle via Settle and Appleby;
- Chat Moss Route from Liverpool to Manchester via St Helens and Newton-le-Willows;
- CLC route from Liverpool to Manchester via Warrington;
- Cumbrian Coast Line from Carlisle to Barrow-In-Furness and Lancaster via Workington and Whitehaven;
- Durham Coast Line from Newcastle to Middlesbrough via Sunderland and Hartlepool;
- Tees Valley Line from Saltburn via Darlington to Middlesbrough and Redcar; and
- Cleethorpes line from Cleethorpes to Doncaster via Grimsby, Immingham and Scunthorpe.

4.3.1 Rail Network Capacity'

Network capacity is one of the key issues for rail. It is a challenge in terms of the capacity of the network to accommodate more trains reliably or flexibly, and in terms of gauge which determines the ability to handle intermodal traffic both on the existing network and for new journeys. Robust timetables are also needed for freight certainty, so the network works as a whole system rather than being disjointed.

HS2 is critical in freeing up capacity for freight on the WCML south of Wigan and on the MML, but the two-track WCML north of Wigan needs significant enhancement to provide sufficient capacity for both passengers and freight. Three freight paths an hour in each direction will be required to convey the amount of freight that could move off the M6/M74. With a revised timetable that makes best use of capacity ('flighting' trains by speed) it may well be possible to create the necessary capacity by the installation of two or three long passing loops, where fast passenger services can overtake freight services, ideally without needing to bring the latter to a standstill. This is supported in the Union Connectivity Review.

Evidence gathered for the strategy suggests that just less than half of freight paths are used in total, however that is not the case on routes or at times where capacity is constrained, for example, on the Castlefield corridor in Manchester. There is little or no spare capacity over the four key freight bottlenecks identified by the network capacity modelling for this report - other than at night. These include the WCML north of Golborne, ECML two-track section through Durham, Midland Main Line through Sheffield, and across Manchester. The work shows that rail freight end-to-end

train times already suffer from significant additional time in order to be squeezed onto the network.

4.3.2 Manchester Recovery Task Force

There is a particular problem in the Manchester area, where all the former main freight lines that avoided the city centre have been closed. That has left most freight trains having to go through the city centre, either through Victoria or along the Castlefield corridor through Piccadilly and Oxford Road which is the only route to the Trafford Park freight terminal. However, the whole network in central Manchester is severely congested which causes extremely high levels of delays to train services, giving Manchester 20% of the locations with the worst train delays in Britain. As a result, Network Rail has formally designated the Castlefield corridor as one of only three locations in the Britain to be "Congested Infrastructure".

TfN is working with DfT and Network Rail to identify what enhancements are needed to rail infrastructure in and around Manchester to enable services to operate reliably and to cater for future growth. That work is focused on passenger services, though freight services would also benefit from any reduction in delays on the network. In addition, TfN is working on a Network Gaps Delivery Plan to set out priorities for new or re-instated sections of line in the North, as part of which consideration is being given to possibilities in south Manchester that could enable freight trains to access Trafford Park without having to go through central Manchester.

Additional new rail freight terminals at Parkside (should it be constructed) and at additional locations such as Warrington and Carlisle could relieve the pressure

on Trafford Park and on the rail network around Manchester. However, even if some volume for the Wigan/Warrington area moves to terminals like Parkside, it is likely to be replaced by increasing urban logistics movements into the city, for which Trafford Park is ideally suited.

4.4 The North's port network

Short Sea Shipping (SSS) is the maritime transport of goods over relatively short distances on routes such as Liverpool to Dublin and Immingham to Rotterdam, whereas Deep Sea Shipping (DSS) refers to the maritime transport of goods on intercontinental routes, crossing oceans.

The primary driver for growth in terms of shipping is intermodal container freight on both SSS and DSS routes. This is reflected in the 2050 forecast although the more predominant intermodal flows are focused on the southern ports, such as London Gateway, Southampton, and Felixstowe, where extensive facilities for handling large container vessels have been created.

The Port of Liverpool has invested more than £400m in the creation of a new deep-water container terminal that will enable two 13,500 Twenty-Foot Equivalent (TEU) vessels to call at one time and hopes to attract regular container ship calls to boost the port's intermodal throughput.

SSS transports the larger volume of cargo into the Northern ports with imports exceeding exports. DSS tends to be focused on large vessels making one call in the UK on global loop routes. Currently some of the intermodal freight brought into Europe by DSS services is fed into ports such as Rotterdam with smaller feeder vessels and SSS services transporting it as both accompanied and un-accompanied freight to the Northern ports. The intermodal

freight that is transported via the southern UK ports generally travels to and from the North of England by rail into and out of intermodal terminals such as Trafford Park in Manchester for onward 'last mile' distribution by road.

The Humber ports dominate the shipping volumes mainly because there are three significant ports (Hull, Immingham and Grimsby) located on the Humber Estuary. Most of the freight handled by the Humber ports arrives via SSS routes. There are also significant DSS services into and out of the Humber.

The Mersey ports are evenly balanced between SSS and DSS with aspirations of future growth in DSS services via the new container berth known as "Liverpool 2". Liverpool has developed a strong network of short sea shipping routes and is a major short sea shipping hub for the Irish Sea area with ro-ro ferry services to the Isle of Man, Dublin, and Belfast (key operators including Stena Line, Seatruck Ferries, P&O Ferries, and Isle of Man Steam Packet) and lo-lo container feeder services to Dublin, Belfast, Cork, and Glasgow and from English Channel Ports (including Southampton, Rotterdam, Antwerp, and Le Havre) for example. These feeder services to the English Channel Ports connect Liverpool to deep sea container services to the Far East, India, Africa, and South America. Peel Ports also operates the innovative container ship service from the Port of Liverpool along the Manchester Ship Canal.

The Tees ports handle mainly SSS services and primarily import freight, with Tyne & Wear ports handling smaller mixed volumes. Lancashire ports handle only SSS services and the ports in Cumbria handle a small amount of SSS services.

Regional ports are also vitally important in supporting the local economy and providing capacity and capability for the North. Improved connectivity is also vital for their role. In Cumbria for the Port of Barrow, road improved connectivity on the A590 through to the M6 is vital and for the Port of Workington both ‘last mile’ road connectivity from the A66 and improved capacity on the Cumbria Coast Line is considered important in supporting their role.

4.4.1 The North's port surface access

The landside facilities for the distribution of goods to and from the Northern ports are imperative to increasing their attractiveness and ensuring freight is moved efficiently across the network.

Many of the Northern ports are located in urban areas such as Liverpool within the city itself and therefore any increase in vehicle flows on the local road network will have a negative impact on air quality with resulting congestion impacting on the operational cost of transport.

Many of the ports feature both road and rail access, however, often routes to join the major transport networks are slow and unreliable. Again, this reduces the competitiveness of the Northern ports. Providing infrastructure to allow freight to be transported to and from the ports effectively is imperative. A good example of where the North falls short in this regard currently is the biomass traffic that is brought into the UK through the Port of Liverpool for onward transport by rail to the Drax site at Selby. The route that trains take between the two points is not direct and often takes a considerable amount of time at low speeds due to capacity concerns (related to train weight and

pathing constraints) on the east-west routes between Liverpool and Yorkshire. Delivery of a gauge-cleared route for full-sized containers by rail on standard wagons and capable of carrying longer heavier trains is what we are looking to see delivered on the Transpennine Route Upgrade on an east-west basis. Delivery of the programme would save more than 170 miles for a return road journey, which will benefit the environment as well as the freight industry.

The Port of Hull's rail connection has recently been upgraded to W10 gauge clearance to enable the movement of containers by rail to and from the port. Immingham, Teesport and Liverpool (restricted train lengths) also have the ability to handle containers by rail.

Similarly, the gauge-cleared route from Immingham to the East Coast Mainline along the South Humber rail line has been delivered. This was jointly funded by the Humber Local Enterprise Partnership (LEP), North Lincolnshire Council, and Network Rail – a very successful project working across many partners. ABP is working closely with their customers to attract trade activity into the area and a significant draw for companies is the ability to put containers onto the railway. The challenge is accommodating additional freight capacity onto the East Coast Main Line in a timely and sustainable manner.



4.4.2 Freeports

The 2021 Budget announced the locations of eight freeports in England. The freeports of Humber, Liverpool City Region, and Teesside are in the TfN area. The benefits of the other freeport arrangements will be felt within the North as the other freeport areas play a significant role in the economy of the North by trade activity.

The eight locations are:

- East Midlands Airport
- Plymouth and South Devon
- Felixstowe & Harwich
- Solent
- Humber
- Teesside
- Liverpool City Region
- Thames

As more clarity on the arrangements emerge TfN will support the delivery of initiatives where this sits within the remits we have agreed with Government. We are already working closely with the Humber Freeport team supporting activity around the decarbonisation of logistics activity within the freeport area. Should similar opportunities arise to be part of other freeport delivery activity we will ensure that we offer any support and expertise that we can to help delivery. The current freeport policy has three objectives:

- Establish freeports as national hubs for global trade and investment across the UK;
- Promote regeneration and job creation; and
- Create hotbeds for innovation.

The policy areas above are reliant on good transport links to enable their delivery so we will continue to articulate the priorities set out within our STP and associated Investment Programme to aid delivery.

A range of benefits will be available to freeports in the following policy areas:

- Customs
- Tax. This includes measures on:
 - Stamp Duty Land Tax (SDLT) Relief
 - Enhanced Structures and Buildings Allowance
 - Enhanced Capital Allowances
 - Employer National Insurance Contributions Relief
 - Business rates
- Planning
- Regeneration and infrastructure: successful bidders will be able to access a share of £175m of seed capital funding, depending on the submission of an outline business case (OBC).
- Innovation

Now the successful freeport areas have been announced by the Government, the identified locations will draw together an Outline Business Case for the regeneration funding available in line with the Green Book. TfN commits to add value and support to this process where this sits within our role.



4.5 The North's inland waterway network

The use of inland waterways represents a significant opportunity for freight in the North for a variety of reasons. The role that waterways play is to allow boat traffic to travel along rivers and canals which reduces the length of time containers and other commodities travel by road or rail. Internal barge traffic declined as coal and associated materials reduced in use for power generation and the market for traffic between industrial plants for energy and disappeared.

In 2021 the Commercial Boat Operator's Association reported the inland waterways accounted for a total of 44.8m tonnes of freight lifted p.a. in Great Britain which has remained stable for the last 20 years. This equates to approximately 3% of total goods lifted by inland waterways with the rest being accounted for on road and rail. Of this, almost a quarter of this traffic was on waterways located in the North.

This was mainly by sea going vessels carrying cargo up the Rivers Ouse, Trent and Humber upstream of Hull, serving wharves (for example PD Ports' Groveport and Keadby) and industrial plants with bulk cargo including aggregates, forestry and chemical products. Along the Manchester Ship Canal there are several locations served by inland waterways. These include the QEII Docks which has a liquid berth, Ellesmere Port and Runcorn Docks which concentrate on bulks and project cargo, Port Warrington which is a site for multi-user warehousing and Port Salford which is a third party operated quayside, warehousing site and bulk store. Peel Ports have a significant interest in these locations.

There are proposals for new and enhanced port terminals along the Manchester Ship Canal such as Port Wirral (Eastham/Ellesmere Port Docks), Port Cheshire (Bridgewater Paper Mills), Port Ince (Protos Energy Park), Port Weston, Port Runcorn, Port Warrington, Port Irlam and Port Salford. There are challenges in terms of infrastructure on the route with key crossings being closed to vehicles as ships pass through the canal. This can often lead to localised congestion.

Inland waterways and potential markets for moving freight on water needs to see modal shift from road and rail to the water. For this to happen there is a need to recognise the opportunity in planning policy reform to protect sites for potential wharves. Additional resources and funding to maintain the waterways across the network would also be beneficial to enable the assets to be used effectively and for new flows to be generated. This has been effectively achieved in the rail freight sector in response to the decline of coal traffic.

Sea dredged sand and gravel

Currently, nearly 80% of the 50m tonnes of sand and gravel used annually within Great Britain is mined inland but the view of the aggregates sector is that soon, most will switch to being sourced from the sea (licensed by Crown Estates) as existing inland quarries are exhausted. The Thames and Solent rely on sea dredged aggregates, and traffic is growing in the North. Large dredgers are landing sand and gravel at TeesPort owned by PD Ports and the Humber Ports owned by ABP. Effectively, this represents a new bulk import that can provide a very long term and secure market for the growth of inland waterways.

The rail market does have a compelling offer for inland transport of aggregates. Stone traffic is growing by rail, particularly from inland quarries in North Yorkshire, the Peak district, Leicestershire and the Mendips and for sand and gravel landed on the Thames (at Angerstein wharf in particular) to distribute inland. Inland waterways offer an alternative for development where the railways are congested.

Developing an integrated approach

The capital and operating costs of barge services per tonne transported is very similar to that for rail freight services to inland rail terminals, but with the added advantage that parcels sizes are smaller (500 tonnes instead of typically 1500 tonne for a railway train) and therefore a wider range of berths can be served for a given overall tonnage throughput. Most importantly while barges can have direct access to the same maritime berths where goods are landed and the product stored at the berth, few berths have direct rail connections.

The need for investment

The Canal and River Trust (CRT) manages the waterways. It is a charity and is not constituted, capitalised or funded to undertake major investment in commercial waterways. While the CRT may be able to form partnership with third party investors for specific projects, CRT cannot afford on its own major infrastructure works.

Transport for the North recognise the significant impact of investment in any freight and logistics activity across the North. This includes the desired investment at the Port of Leeds at Stourton and the investment needed along the Aire and Calder navigation to allow larger

barges to access the port should the required investment be achieved. We also recognise the importance of the inland water activity along the Manchester Ship Canal and Peel Ports' significant ambition to grow waterborne freight and warehousing opportunities along the route. Longer term investment along all the waterways is needed including upgrading to improve efficiency and reliability of equipment, locks and facilities for boaters along the routes used.

4.6 Air freight in the North

It is important to recognise the roles that the North's various airports play in economy of the North. While Manchester Airport handles the largest volume of air freight in the North, freight also flows through Doncaster Sheffield and Newcastle airports in significant volumes.

Air freight is a key component of the UK's international freight connectivity. This was well illustrated at the height of the Covid-19 pandemic when air freight of medical supplies and equipment, as well as basic goods and services, were critical to the UK. More generally, air freight plays an important economic role in the transport of high-value and/or time-critical freight, where other modes may not be viable options.

Most of the freight is carried in the bellyhold of existing passenger flights, however our local airports in the North play a key role in ensuring rapid domestic connectivity, enabling overnight deliveries of mail and other time sensitive goods throughout the UK. Links into airports outside the North are also important. East Midlands Airport for example is the UK's largest dedicated freight airport and acts as the UK's hub for air freight logistics.

Air freight and logistics are closely linked to road freight, since the relatively high value, low volume, and time critical nature of air freight requires the speed and flexibility that road connections into air logistics hubs provide.

4.7 Future freight growth

The growth of freight in the future is heavily attributed to the increasing number of national distribution centres (NDC) and regional distribution centres (RDC) in line with the growth in online retailing and the move towards next-day delivery of a wide variety of goods. In 2050¹⁸, more NDCs are forecast within central England, which are predicted to supply RDCs in both the North of England and in Scotland. This also results in longer length of haul by road freight, reflected by an increase in the domestic average length of haul from 93km in 2016 to 130km in 2050. This is a key area in which modal shift to rail could be achieved.

Tyneside and Tees Valley in the North East have seen a significant take up of logistics and distribution space, although this has not been on the same vast scale as the major established UK logistics parks in the Midlands, South East, and North West of England. These Northern key logistics hubs are often based on historical geographies, some of which have connections with ports and airports (such as Newcastle International Airport and the associated pharmaceutical industry), while others have developed independently.

There are several key logistics centres that serve a wide variety of commodities that are moved around, to, from, within the Northern trans-Pennines area, including fast-moving consumer goods (FMCG), construction, and support for the energy

supply chain. Across the Northern trans-Pennines freight is mainly moved on the road network since there are no significant intermodal locations in this region, and an absence of gauge clearance and capacity on rail.

In the West and Wales region, covering the areas of the Liverpool City Region, the Manchester City Region, Cheshire, and North Wales, there has been significant growth in recent years in energy, health innovation, and advanced manufacturing industries. The recent investment in a deep-water container terminal, "Liverpool2", also reflects the aspiration of the region to increase its freight potential. Along the Southern Pennines corridor there is a significant business and industrial presence, with a strong advanced manufacturing cluster in Sheffield, to add to Manchester's and Liverpool's specialised materials and manufacturing centres.

4.8 GB Railfreight case study

GB Railfreight investigated route planning for W10 gauge. The new University of Hull software for timetable planning was used. This was developed by the Liverpool to Humber Optimisation of Freight Transport (LHOFT¹⁹) project. GB Railfreight inputted a request for a W10 gauge flow from Immingham to Trafford Park and it showed the most direct route was via Diggle. That means it would be the most commercial route, was properly gauge-cleared, and had the capacity during the day. The next best option that is currently W10 gauge-cleared is the route crossing across Lichfield to Burton to Chesterfield, which is far further.

The Diggle route is 117 miles and the Lichfield to Burton to Chesterfield route is 205 miles. That is an additional 176 miles for the journey there and back using

the second route. Both legs would be loaded with containers as this is what the ports and operators need and want as the market is there. That means there would be an additional 'variable track access charge' – that is a 'bill' for the extra 176 miles of journey. That doesn't include the additional driver hours it would take or the fuel the train would use.

This example clearly shows why Transport for the North and our freight industry colleagues have repeatedly called for improvements in the Diggle route through the Transpennine Route Upgrade. There is demand from operators to run the trains fully loaded and they have said they would make this sort of flow work. There are currently very limited examples of companies showcasing and demonstrating that they would be able to make it work because Diggle is not gauge-cleared and doesn't have the capacity available to showcase the opportunity. This is also why all the modelling shows no container flows – because they are currently impossible to run. This is why the economics for this flow just do not work at the present time and investment in the full Transpennine Route Upgrade is needed as soon as possible.



5. Defining our freight and logistics objectives

TfN's Strategic Transport Plan sets out the importance of moving goods across the North and freight is fully embedded into the TfN Investment Programme published alongside the STP. This section defines the proposed objectives of a multimodal freight strategy that can meet both the current and future needs of the North of England. These freight specific objectives build on the wider objectives of TfN, DfT, local authorities, National Highways, Network Rail and other key delivery partners. The objectives are presented to be modally agnostic, and are therefore equally relevant to road, rail and waterborne freight.

5.1 TfN's strategic transport objectives

The STP sets out the evidence on how improved transport connectivity will deliver greater prosperity and a better quality of life for citizens in the North of England.

The STP sets out TfN's vision:

“A thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all.”

Supporting this vision are four pan-Northern transport objectives, which inform the development of the STP and TfN's work programmes:

- Increasing efficiency, reliability and resilience on the transport system;
- Transforming economic performance;
- Improving inclusivity, health and access for opportunities for all; and
- Promoting and supporting the built and natural environment.

These objectives align closely with the five foundations of productivity set out in the Government's Industrial Strategy, as well as helping achieve Government's commitments to 'levelling up' and 'building back better'.

To realise the benefits of agglomeration and economic mass, the North requires faster, more efficient, reliable, and sustainable journeys on the road and rail networks. Yet these existing networks have several challenges.

Over the last two decades, the North's railway has experienced substantial growth in passenger numbers despite a legacy of underinvestment. Much of that growth has been accommodated within pre-existing capacity, but this is no longer possible on many routes, and most of the North's key rail hubs are now at capacity. The North's rail network lacks sufficient capacity for growth and is severely constrained by on-train congestion, low journey speeds and poor punctuality. Evidence for this can be found in the increasing difficulty of securing new or competitive paths for freight.

During the initial phases of the Covid-19 lockdown, rail passenger numbers fell sharply as people who were not key workers remained at home. The number of passenger trains that ran on the network reduced to reflect this and freight services increased. The main area of more efficient running was the ability to run longer trains because the freight trains didn't have to repeatedly wait for passenger services to pass in shorter loops that cannot hold trains that are 775m long. This increased the number of containers that were able to move key supplies of food, medical, and personal protective equipment to various rail-connected destinations. Also, trains could move at higher speeds because they could maintain a faster speed for longer. Large, heavy freight trains take a similar amount of time to stop as any passenger or lighter freight service, but they do take longer to accelerate, meaning vital time maintaining speed is beneficial instead of starting and stopping.

Where there are established freight services planned into the timetable, it was much easier to achieve the improvements quickly to respond to the needs of customers during the pandemic. The problems are more concentrated for



newer freight flows rather than those which have been allocated for many years as the timetables they fit within are much more congested than many years ago.

Covid-19 presented network opportunities for the rail and freight operating companies. As we reported to the Rail North Committee from the Rail North Partnership, prior to Covid-19, Northern Rail's on-time train performance levels were 54.2% of all trains arriving on time and grew to more than 77% during the pandemic. Similarly, TransPennine Express had only 37.5% of trains arriving on time and rose to 72% during the pandemic. This is mainly due to a less congested network because the recent increases in service levels have already led to small declines in performance. Further increases following the third lockdown could also lead to a decrease as the volume of trains on the network, the increase in passengers travelling, and an increase in dwell time all reduce the timeliness of services.

Similarly, east-west road connectivity is also a significant barrier for future growth in the North, and a key constraint to agglomeration and transforming the North's economy. Currently the M62 is the only motorway standard east-west road link across the Pennines between Derby in the Midlands and Edinburgh in Scotland. Road capacity across the Pennines is hindered by the absence of a gauge-cleared route for rail container traffic, which therefore must use road even though intermodal is now the largest and fastest area of rail traffic growth. The flows could make their way through the Midlands or Scotland to achieve rail market growth, but the fuel and handling costs would be extremely high making the journeys too expensive. Other major arteries, including the M1, M6, M56 and A1 (South

Yorkshire) corridors, are also already heavily congested and are acting as major barriers to transforming the North's economy.

A key priority of TfN's Strategic Transport Plan is to support economic growth that is inclusive and sustainable. This means investing in strategic transport improvements that ensure all areas of opportunity are connected, and that communities are not disconnected and further isolated. It also means protecting and renewing the high-quality natural environment in the North, which is already an asset and a reason why many people and businesses chose to live in and visit the North.

TfN's ambition is to push harder and faster towards zero emissions from its surface transport network than current Government policies and proposals. To this end, TfN published the Transport Decarbonisation Strategy in December 2020.

This Freight & Logistics Strategy reflects the objectives of TfN's Transport Decarbonisation Strategy, firstly in achieving close to zero emissions from our surface transport system by 2045, and secondly in optimising the social and economic benefits from clean growth opportunities in the North.

It is clear from the suite of TfN policy documents that Northern leaders believe rail should be encouraged to deliver TfN policy objectives on the economy, transport efficiency, health, inclusivity and decarbonisation. Capacity and gauge clearance for trans-Pennine freight and rail electrification are specifically mentioned.



6. Proposed TfN freight objectives

The following objectives are outlined for delivery across TfN, partners, Government, other STBs and the private sector. They are set out to show how varied the sector is and it is important to note that no single

organisation could deliver the whole suite on its own. TfN's role will be to coordinate activity and encourage partners to work together.



TfN pan-Northern Transport objectives	Timing
<p>Increasing efficiency, reliability, integration, and resilience in the transport system</p>	<ul style="list-style-type: none"> → Reduce the number of incidences of unplanned closures of Major Road Network routes leading to severe journey delay. → Prioritise measures that tackle journey reliability and congestion. → Support less polluting and more energy efficient movement of goods on the transport network; → Maximise the utilisation of rail, inland waterways and local distribution hubs to improve efficiency and support the modal shift of goods from road to rail and water. → Improve the multimodal north-south and east-west connectivity across the North.
<p>Transforming economic performance</p>	<ul style="list-style-type: none"> → Optimise efficient flow of goods on the MRN and railway through improved flow of traffic and supported by technology. → Maximise the economic development opportunities through a range of areas, including the clean growth opportunity flowing out of freeports, clean industrial clusters and the first mile freight that flows out of ports.

TfN pan-Northern Transport objectives	Timing
Transforming economic performance (continued)	<ul style="list-style-type: none"> → Optimise data availability to support partners in including a freight dimension in building their business cases for transport interventions. → Support the planning and development of well-connected warehousing and consolidation sites. → Exploring the benefits of regional freight consolidation and distribution networks.
Improving inclusivity, health, and access to opportunities for all	<ul style="list-style-type: none"> → Reduce the impact of air pollution from freight movements on the health of local communities. → Reduce the impact noise from freight movements on the health of local communities.
Promoting and enhancing the built, historic, and natural environment	<ul style="list-style-type: none"> → Increase electrification of the rail network. → Decarbonise road haulage through increased usage of zero carbon and low emission fuels.



6.1 TfN's strategic transport objectives

The Long-Term Rail Strategy²⁰ (LTRS) formed a significant part of the evidence that informed the Strategic Transport Plan when an updated draft was released in January 2018. There was significant engagement on the content with partners and the private sector when it was drafted and it forms the basis for our Strategic Rail activity.

The LTRS sets out a complementary, compelling, and tangible set of conditional outputs required to realise the TfN vision. It includes deliverables which support the achievement of the objectives, but which are subject to further assessment of deliverability, affordability, and value for money.

Through the conditional outputs, it is intended to deliver:

- A step-change in connectivity;
- Provision of capacity within the infrastructure and train services to cater for growth;
- A rail network which customers will find easy to access and use;
- A railway which supports the communities it serves; and
- Enhanced cost-effectiveness of running the railway.

These changes can be summarised around five key themes:

Connectivity:

- Reduce journey times between the North's economic and freight centres, and between these centres and international gateways.
- Reduce journey times between the North's economic and freight centres and key centres across the UK.

Capacity:

- Provide the infrastructure capacity and capability to increase the permissible speed, weight, gauge, and length of freight trains to cater for proven existing demand and for evidenced future demand.

Customer:

- Increase the right-time punctuality of passenger and freight services in the North.
- Decrease the percentage of cancelled passenger and freight services in the North.

Communities:

- Improve air quality and reduce CO2 and other harmful emissions both on and about the railway estate and in wider society through modal shift to rail.

Cost effectiveness:

- Reduce the cost per passenger mile and per freight tonne km of services in the North.
- Grow the net revenue generated by the North's passenger and freight railway while delivering high-quality services and inclusivity.

6.2 TfN's Long-Term Rail Strategy Desirable Minimum Standards for freight

The 'Desirable Minimum Standards' were agreed as part of the first LTRS and stayed in place in January 2018. There were three that related to freight and logistics. It should be recognised that the standards were agreed to be ambitious and delivered by 2050. The contents of this strategy set out how the action we take as TfN can enhance delivery of the standards. They are set out below for reference:

- The North's rail network to accommodate the evolving needs of the freight market
 - supporting longer and heavier trains, increased path availability, and additional gauge clearance.
- The five major ports in the North (Hull, the Humber Ports, Liverpool, Teesport, and Tyne) to be served by rail with gauge clearance allowing the latest generation of intermodal containers to be carried on standard wagons and weight capability enabling trains to operate unrestricted at the highest speed appropriate for the load.
- Improve the average speed of freight services in the North by 50% over the next 10 years (by 2028).



7. Existing evidence

A review was carried out of the available strategies and plans for the UK as well as for the North specifically. This includes documents from Network Rail, National Highways, Department for Transport, and other partners including Local Authorities. The benefit of closely analysing the available documents is that they show a consulted view of the freight and transport world that TfN can review progress against, as well as providing an initial list of interventions and programmes that either have been delivered or require delivering.

7.1 Key rail emerging themes

Several themes emerged from the rail literature review and industry consultation. These range from macroeconomic narrative to issues relating to policy areas (such as the balance of freight and passenger markets in rail planning and policy development, and the dynamics between freight and the planning system), to identification of specific network locations needing intervention. A summary of themes is provided below:

- Despite the decline of coal traffic in the last decade, there has been strong growth in intermodal and construction (including aggregates) traffic in the last two decades. There are consistently strong future demand growth forecasts across documents from TfN and Network Rail.
- There is strong policy support for rail freight contributing towards decarbonisation and the net zero agenda as well as reducing congestion on the roads especially on the north/south and east/west key freight corridors.

→ Rail freight is also recognised as a contributory factor towards overall economic efficiency, as evidenced in documents by DfT, Network Rail, Rail Freight Group and others. Some benefits would be more pronounced with further electrification of the rail network – the current electrified network is too limited for widespread adoption of electric rail freight. This should be complemented by consideration of the first and last mile of journeys also being decarbonised.

→ There is no suggestion from the evidence that has been reviewed that the market is inefficient – there are no concerns that freight enhancements could disproportionately benefit a single operator due to current market dominance.

→ The evidence suggests that the largest constraint is rail network capacity congestion and network pinch points over and above lack of electrification for freight. Evidence of capacity constraints tends to be largely anecdotal, but this is usually evidenced by slower than historic/theoretically optimal journey times as is apparent in Working Train Timetables (WTTs). Research undertaken for this strategy shows that the current freight trains could be 23% faster if the network operated without holding freight trains in certain places either in loops or behind other services. This is making rail less competitive.



Common themes in the North include:

- The dual lack of quality trans-Pennine freight paths and routes with sufficient gauge clearance for intermodal traffic – this is thought to be the main contributing factor to the lack of penetration of Northern ports (Liverpool, Humber, Tyne, Tees). Provision of a gauge-cleared trans-Pennine rail route is the simplest means to take road freight traffic off M62, widely documented from a range of TfN and Transport for Greater Manchester (TfGM) documents, and onto rail.
- Restricted availability and quality of paths for accessing Trafford Park and other intermodal termini included in the TfGM Rail Strategy discuss options for additional rail linked terminal capacity on top of Trafford Park as well as options for improving existing rail network to Trafford Park.
- Overall lack of data sharing between freight and logistics companies means it is more complex to evidence the benefits that investment in infrastructure brings, meaning business cases still rely on passenger information to build-in benefits.
- Key locations for congestion are on the West Coast and East Coast Main Lines such as Winwick Junction and around Doncaster.

- As we previously referenced in the Enhanced Freight and Logistics Analysis, there is continued emphasis of the importance of additional rail-connected warehousing and distribution sites that minimise the distance and impact of onward ‘last-mile’ distribution by road, and the importance of the planning system to support the development of such facilities.

7.2 Recent and forecast growth trends

There are several common themes in terms of recent commodity trends. Documents by Network Rail, TfN, TfGM and the Rail Freight Group all mention the following three broad trends:

- Decline of coal traffic
- Growth of intermodal container traffic, especially from Felixstowe, Southampton and London Gateway
- Growth of construction traffic namely aggregates from quarries.

Most freight forecasts have adopted a similar methodology – using the Great Britain Freight Model (GBFM) developed by MDS Transmodal, with varying input assumptions. While forecasts vary, they all predict ongoing growth in intermodal and construction traffic, and other commodities staying relatively constant.

7.3 Key emerging road themes

The common road themes for the North include:

- The strength of the North relies on its potential to increase multimodality with the prospect of a shift from road to rail being one of the priorities in the agenda.
- The North’s 11 ports can play an equally important role in the intermodal domain and expand their market share dependent on the accessibility constraints both on the road and rail sphere being resolved.
- Impact of Brexit on southern ports might open an opportunity to increase the activity on Northern ports, which may result in additional pressure in the road network.
- Congestion and reliability are the main issues experienced by road freight on the Major Road Network, particularly in the east-west connection due to limited capacity of the current infrastructure.
- The freight market in the North is heavily dominated by road with 87% of the tonne kilometres transported on our road network.
- Freight market in the North is expected to grow by more than 30% until 2050 across all modes.



7.4 Network congestion - Road

The key issue for road freight is network congestion. On all highway routes road freight is a minority user even though more than 90% of the North's freight is moved on the road network. However, there is no existing appetite for building freight only highways or converting existing highways to freight only.

Road enhancement schemes are considered as part of a wider business case that is usually dominated by non-freight road traffic benefits. The highway schemes are for all different vehicles and are not solely proposed as freight schemes. However, TfN included some schemes within the initial Investment Programme that were freight schemes. Now there have been amendments to the Green Book process, the building of business cases is more heavily focused on developing the 'strategic' case for investment. This helps freight and logistics schemes increase their chance of securing public funding.



7.5 Highway intervention locations

Key areas of the highway network where interventions would benefit freight flows that are currently constrained include:

- East-west trans-Pennine movement on:
 - M62
 - A66 from Tees Valley to Penrith – particularly vulnerable to weather conditions
- North-south connection through:
 - M1 around Sheffield
 - A1 east of Doncaster
 - A1 Newcastle - Gateshead Western Bypass
 - A19 in the Tees Valley and North East – pinch point at Tees crossing
 - M6 in Cheshire and Warrington
- Access to 'constrained' ports:
 - A5036 to the Port of Liverpool
 - A63 to the Port of Hull
- Freight connectivity:
 - Access to and from intermodal terminals (at Trafford Park, Leeds, Garston, Doncaster iPort Rail and Widnes) and international airports (particularly Manchester and Newcastle)
- River and estuary crossings:
 - Connectivity between major distribution centres and sensitive industrial clusters
- Major Road Network:
 - Air quality interventions in major urban centres
 - Growth of last-mile distribution including to all newly allocated freeports

7.6 Rail network capacity

Network capacity is also the key issue for rail. It is a challenge in terms of the capacity of the network to accommodate either more trains reliably, or flexibility around where the trains travel to or from, and in terms of gauge which drives the ability to handle intermodal traffic both on the existing network and for new journeys. It is worth noting that the economic shock of Covid-19 resulted in freight traffic returning to pre-pandemic levels and increasing. Passenger demand took much longer to return to pre pandemic levels as people change their working patterns. However, the passenger operators have seen an increase in leisure travel which has helped.

The DfT Rail Freight Strategy²¹ from 2016 and current and emerging thinking from both Network Rail and TfN, emphasises the need to use the existing freight paths efficiently. There are existing market incentives for operators to do so, for example to ensure that trains are loaded towards the maximum loading of goods or containers and maximum lengths on the routes they travel on. This is unlikely to create the extra paths that will be required to accommodate the unsuppressed demand that underpins DfT's and Network Rail's own rail freight forecasts.

There is also a concern in the rail freight industry, which has been expressed at recent Network Rail workshops, that efficient paths may become a euphemism for "less" freight paths with freed capacity being reserved for passenger traffic. There is much debate about freight operators having capacity that they do not use. The argument for this from freight operators is that they need the flexibility to enable them to serve different locations on different days and at different times to meet their

customer needs, building as much flex as they can. This helps grow the rail market in the longer term so journeys can have a little flex on the rail – a right which haulage companies simply have.

While evidence gathered by counting trains on a sample of running days suggests that less than half of freight paths are used, that is not the case on routes where capacity is constrained, for example, in the area around Manchester. There is little or no spare capacity over the four key freight bottlenecks identified by the network capacity modelling. These include the West Coast Main Line north and south of Golborne, East Coast Main Line two-track section through Durham, Midland Main Line through Sheffield, and across Manchester. The work has shown that rail freight end-to-end train times already suffer from significant additional time to squeeze onto the network.

For new rail freight journeys, achieving a timetable slot on the network is currently challenging. 19% of the end-to-end journey time for the average freight train journey is made up of congestion-related delays. If you removed the delays, then journeys would be 23% faster for all the existing services. Even doing this on the existing network (with no enhancements and investments) decreases average journey cost by nearly 8%. This cost reduction increases the attractiveness and therefore the demand for rail freight by 6.4% nationally. This does not include the demand for routes where the infrastructure is not capable of carrying intermodal traffic, this is just for the existing market today.

This means that new journey opportunities for rail freight are more expensive and marginalised. The ultimate impact in the current climate is for shipping companies

to use road transport over rail freight as it is free at the point of access onto the network and all key routes are provided through the MRN.

Government is investing heavily in rail with HS2 and building the case for Northern Powerhouse Rail which is comparatively more than road investment on a cost per tonne/passenger basis. In addition, to help rebalance the British economy, HS2 is often referenced as having freight capacity benefits. HS2 Ltd has stated in Freightmas and HS2 published by HS2: "By putting direct inter-city passenger services on dedicated high-speed lines, Britain's new high-speed railway, High Speed 2, will create more capacity on the existing railway for Britain's growing rail freight sector. As a result of enabling more freight by rail, HS2 will help deliver more of what Britain needs in a more sustainable way, as it will assist in removing thousands of lorries off our roads, reduce carbon emissions and make our motorways safer."

HS2 will reduce journey times between the North and London. If the whole network was built as described, it would have reduced the demand of intercity trains for paths on the West Coast, East Coast and Midland main lines, which would have potentially freed up capacity for freight on parts of those lines. We will work with government and the industry to work out the full implications of this and what actions need to be taken to support the growth of rail freight.



7.7 Gauge enhancements

Capacity for rail is usually expressed in terms of train frequency, but for freight, gauge clearance is also an issue. This means how tall and wide the bridges and tunnels are and whether certain containers can safely travel under and through them. The North suffers from the fact that intermodal container services cannot physically fit across the Pennines on an east-west basis because the tunnels are too small. This means that ports and industries in the east cannot use rail for container traffic needing to move to/from the west and vice versa.

The ports in the west and in the east face different markets. Liverpool is strong in the North America market, and Hull and Immingham in the short sea European market and are served by different shipping services.

These Northern ports are less able to serve their natural hinterland. Teesport has developed a regular container service to Doncaster by rail despite fierce road competition. This service benefits Teesport, Doncaster and the communities on the A1. An additional service from Teesport to the North West should be economic to operate by rail because of the longer distance and the opportunity to spread Teesport's rail investment costs over more traffic. However, no such service operates over this route because the trains would have to run via Litchfield - the extra distance makes rail uncompetitive. Container traffic flow on this route is likely therefore to be road based or enter/leave Britain via another east coast port. This impacts on the efficiency of the economy of the North as well its environment.

Network Rail is testing two technical solutions – one requires a smaller level of investment in infrastructure but the use of “low liner” wagons. Some stakeholders oppose the use of “low liner” wagons because of their lower carrying capacity both per wagon and over a given length because of the extra space required to accommodate the shape of the wagon, and because such wagons would need to be built and are thought by some stakeholders to be more expensive to maintain.

The balance of approach needs to be carefully considered. Given the levelling up agenda our position is clear – that we seek assurance that we will have a fully gauge-cleared route to allow freight to move on an east-west basis connecting our major freeport complexes. Understanding the alternatives is necessary but given that southern routes have had the investment, and growth has then been seen, it is critical that the North receives the same opportunity.

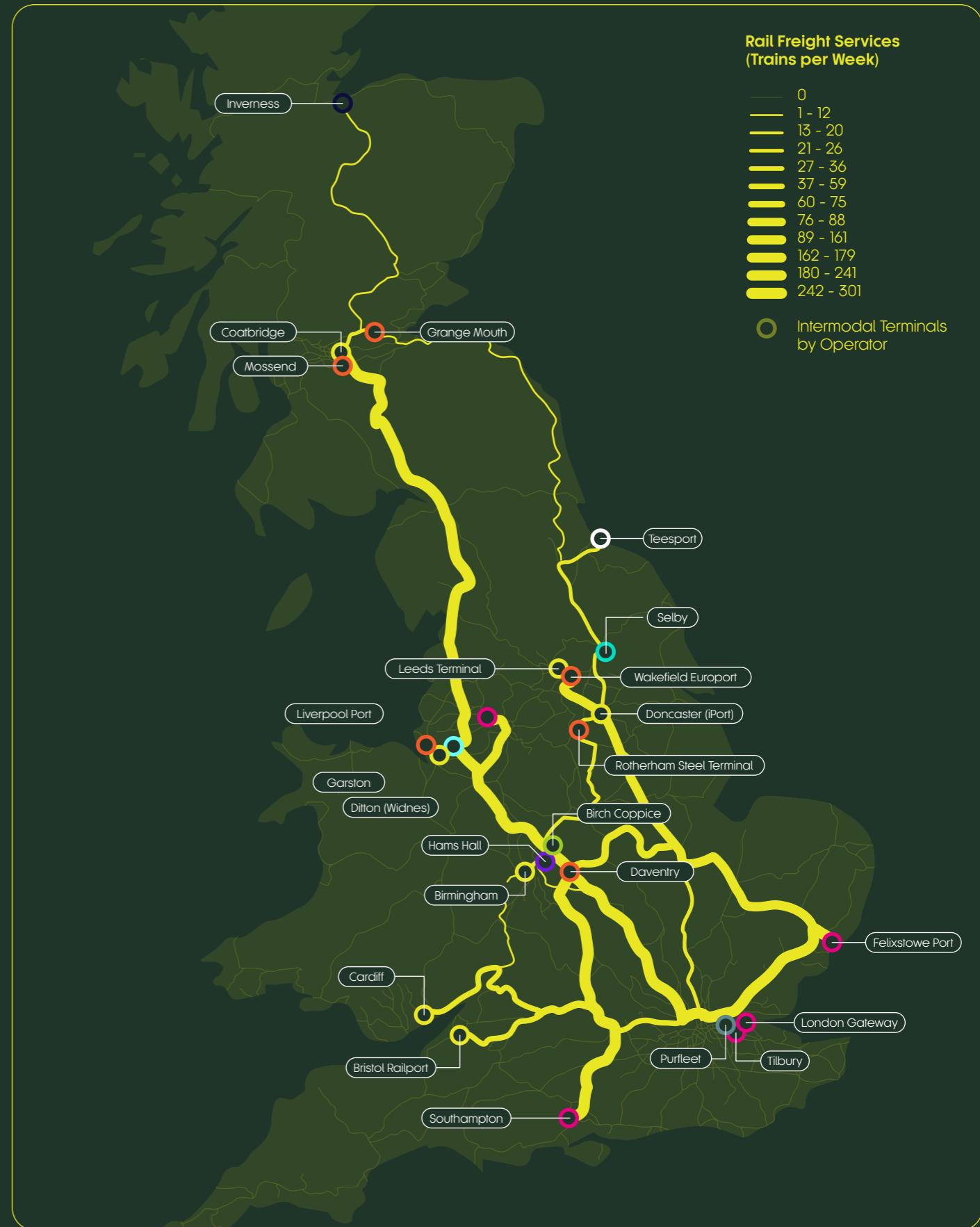
Highway and rail connected terminals

The North has few rail-fed connected terminals – particularly west of the Pennines. The dominant position of Trafford Park is both evidence of the desire for rail terminals in the North West and the lack of alternatives. This makes capacity issues all the greater as Trafford Park sits close to Manchester city centre on some of the busiest rail lines in the North.

Alternative terminals on different lines may reduce the network capacity impact of intermodal freight through Manchester.

This concern about the lack of terminals is not a new issue as there is a policy position within the STP for TfN to work

Figure 3: UK intermodal rail services per week (two-way)



with partners and the private sector to explore the benefits of regional freight consolidation and distribution networks, and the network of construction consolidation centres.

TfN recommends that we could play a role in determining the best locations to develop warehousing – particularly where the opportunity for rail connection exists. If agreed by partners this could form evidence for the generation of new Local Plans once the planning policy arrangements are released by Government.

Decarbonisation

One of the other key issues for freight is decarbonisation. While the current emissions for freight do not form the largest emitter of the transport sector, they are nevertheless significant, and the proportions will alter as other areas decarbonise.

Highway freight decarbonisation

Central government has yet to set out a single strategy on how road freight will be decarbonised. The expectation is that a combination of technology shifts, grants, and taxes will encourage highway freight users to shift to electric or hydrogen vehicles. Freight is generally expressed as part of a wider approach to highways despite the obvious higher scale of the technical challenge of decarbonising freight vehicles. However, the current quickest and simplest way of decarbonising road freight is to send more by rail which, even with diesel traction, is 76% lower in terms of carbon emissions per tonne km. It is worth bearing in mind that rail is not yet carbon neutral either, with significant distances of electrification

to take place to help that to happen. Overall, it will be for the road freight sector to decarbonise and design the ability for each decarbonised vehicle to be able to carry the loads that diesel vehicles can.



Rail freight decarbonisation

Northern Powerhouse Rail and other initiatives supported by TfN seek for more of the rail network in the North to be electrified. Network Rail has issued an interim programme business case for its Traction Decarbonisation Network Strategy. However, there is no certainty of funding for electrification of the wider network – and the routes used most by freight traffic (excepting sections of the Midland Main Line) tend to be lower priorities than routes used by frequent passenger services. Network capacity issues may also drive freight onto alternative routes to the West and East Coast main lines that currently have a still less pressing case for electrification investment.

It has been suggested that hydrogen or battery operation may allow freight to be decarbonised without investment in network electrification equipment and supply. However, the power required of freight locomotives is very much larger than for passenger vehicles, and no technical solution has been proposed that will not compromise the performance of freight – thus making rail freight both less capable and more expensive.

TfN will continue to work with Network Rail and DfT to ensure certainty around the investment in electrification of the rail network. That will help industry understand the plans and timelines so they can respond with providing investment in their rolling stock that matches the delivery of the electrification work. This will offer some security so the freight operators can plan to invest in the appropriate engines that match the infrastructure.



8. Decarbonisation and electrification of freight

According to the latest DfT Transport Statistics Great Britain 2020, greenhouse gas (GHG) emissions resulting from freight movement, which includes HGVs, vans and domestic shipping, accounts for 37% of total domestic transport emissions. Van movements have seen a particular intensification, with a doubling of van traffic since 1990 increasing van emissions by 67% compared to 1990s levels.

With GHG emissions related to congestion as well as vehicle traffic, areas which are already constrained or showing signs of congestion, such as those identified in the Enhanced Freight and Logistics Analysis Report, including the M62, M6 and A1(M), will produce increased GHG emissions unless interventions are undertaken.

8.1 Decarbonisation targets

In July 2018 the DfT published The Road to Zero strategy setting out a commitment to end the sale of new conventional petrol and diesel cars and vans by 2040, and laying out steps to decarbonise road transport including freight with the aim of achieving almost every van and car to be zero emission.

In June 2019 the UK Government made the legally binding commitment to achieve net zero GHG emissions by 2050, and in April 2021 stated their intention to align with the Climate Change Committee's sixth carbon budget, including a 78% reduction in whole economy emissions by 2035. In 2020, DfT brought the date to end the sale of petrol and diesel cars and vans forward to 2030, or earlier if a faster transition appears feasible.

As a starting point to developing its Transport Decarbonisation Plan, the DfT published in 2020 the 'Decarbonising Transport: Setting the Challenge' document to lay out the direction of travel, at a high level, in terms of the focus of policies and priority areas likely to be included in the Government's Transport Decarbonisation Plan.

Within its Strategic Transport Plan (STP), TfN committed to the development of a Northern Decarbonisation Pathway to 2050, to support meeting the national net zero pathway. TfN's response to DfT's 'Decarbonising Transport: Setting the Challenge', set out our approach to developing the Transport Decarbonisation Plan identified key messages and recommendations to be considered by the Government:

- The need for a quantified national pathway to net zero for transport by 2050, and a clear functional policy framework.
- The need for certainty on the role of national and local government, as well as STBs and the private sector.
- The need for a clear decision on road user charging for all roads.
- The need to develop an inclusive decarbonised transport solution for those living in dispersed communities.
- That Government should utilise the evidence base being prepared by TfN and other STBs.
- That the North is awarded an equitable share of any funding for the trialling and development of emerging technologies.

Following this first examination of the decarbonisation challenges, TfN has developed a Transport Decarbonisation Strategy for the North of England, which sets TfN's Decarbonisation Trajectory, estimates the future baseline emissions under each Future Travel Scenario,²⁵ and explores the likely level of policy commitment required to bridge the gap

between the forecast emissions under the Future Travel Scenarios and the required emissions under the Decarbonisation Trajectory (known as policy gap). The result of this analysis forms TfN's Decarbonisation Pathways and provides the focus for related policy recommendations and TfN's priority decarbonisation actions to 2025. The summary table of these actions for freight is included at the end of this chapter.

In July 2021 the Department for Transport published the Transport Decarbonisation Plan²⁶ including a consultation on decarbonising HGVs by 2040. The industry has already responded with a trial of two vehicles running for Tesco on a 60-mile round trip in Wales for depot-to-depot journeys. The challenge of having longer range batteries to power 44-tonne vehicles is being researched at pace to assist in delivering the decarbonisation challenge.

8.2 Decarbonisation challenges

The National Infrastructure Commission (NIC) report²⁷ emphasises the importance of regulatory certainty and consistency in driving positive innovative changes in the freight and logistics sector. A regulatory framework that sets out policies that consider and encourage technological advancements is fundamental to achieving the net zero pathway. Uncertainty on future freight regulations, such as the type of alternative fuels technology to adopt, creates significant challenges for both freight industry and planning of infrastructure.

While the technology for zero emissions cars is well advanced, there is more uncertainty about the optimal technology for zero-emission HGVs. This provides a significant challenge for meeting sales targets for zero-emission HGVs that TfN has set out for the next 25 years, presented in the table below.

Figure 4: TfN's Decarbonisation Pathway

		2025	2030	2035	2040	2045
ZEV share of sales	Cars	55%	100%	100%	100%	100%
	Vans	40%	100%	100%	100%	100%
	HGVs	26%	44%	72%	100%	100%
Rail decarbonisation	CO2 reduction on baseline	0%	25%	75%	100%	100%

Hydrogen powered delivery vehicles which emit no tailpipe GHGs nor any other harmful exhaust gases are likely to have a crucial role in achieving the carbon targets. However, there are several barriers and challenges, ranging from providing adequate refuelling infrastructure to funding support, production technology, and cost. Technology trial projects would provide essential evidence for the feasibility of different HGV technologies. With the support of robust strategies that promote the adoption of alternative fuelled freight vehicles (decarbonisation strategies, funding, aligned strategic transport plans) and by gathering evidence through demonstrators there is an opportunity to raise the confidence of HGV fleet owners and leverage regional partnerships in the North to purchase zero-emission HGVs in bulk.

Within the North, many Local Authorities have already taken action to drive the change towards alternative fuel with electric vehicle (EV) charging initiatives to reduce carbon emissions; however, most of the initiatives are focused on private vehicle users since there is still a lot of uncertainty about the optimal technology for zero-emission HGVs.

A priority activity identified within TfN's Transport Decarbonisation Strategy is to undertake or facilitate a pan-Northern hydrogen transport refuelling strategy, to provide a 'look-ahead' of what an effective hydrogen refuelling network for the North could look like, servicing both HGVs and rail. Considering factors related to the supply and transport of hydrogen, as well as the spatial requirements of refuelling facilities, the study would provide an important part of the evidence base upon which both policy makers and freight operators can begin to make future investment decisions.

Although freight operators are already strongly incentivised towards efficiency, some opportunities for improvement, particularly in relation to reducing vehicle mileage and increasing vehicle efficiency, are missed due to barriers in terms of information sharing between operators. Data democratisation measures would ensure that all freight operators both large and small would again be able to make operational and investment decision based on robust and current evidence.

Last-mile freight deliveries using active modes can also contribute to achieving the national net zero goal. Utilisation of cargo and e-cargo-bikes can help deliver low or zero carbon delivery networks, alongside demand management measures such as promoting and incentivising the use of green shipping options by both shippers and consumers.

Freight consolidation at different stages of the transport chain, from the procurement to the last-mile delivery, also gives an opportunity to reduce carbon emissions. By optimising the parcels transported in each vehicle and using the vehicle capacity more efficiently it is possible to

reduce the number of goods vehicles trips which leads to a reduction in carbon emissions and congestion, by potentially removing several vehicles from the road network. Micro-consolidation centres can also make the use of cargo and e-cargo bikes more effective.



In November 2021 TfN's Board approved the Transport Decarbonisation Strategy which was widely consulted upon and supported by partners and industry. The freight priority actions contained and agreed within the strategy are presented below:

TfN's priority decarbonisation actions: Freight

TfN action	TfN decarbonisation action	Scope	Timeframe	TfN action	TfN decarbonisation action	Scope	Timeframe
Supporting	Stakeholder priority - Low carbon urban freight scenarios.	Research on appropriate place-based, low carbon, urban freight (last-mile) solutions in the North.	Pre-2025	Supporting	Support partners to aggregate large orders of ZEV vans, truck, and buses across the North.	Current ZEV production will not meet the demand required to hit our targets. By helping to aggregate demand from stakeholders across the North, significant numbers of vehicles would be drawn to the region and would signal to manufacturers that the regional demand is present.	Continuous
Leading and supporting	Stakeholder priority - Developing and supporting partnerships to consider zero carbon, port-to-port freight corridors.	Exploring the potential for our partners (ports, Local Authorities, and delivery authorities) to work together to deliver effective 'port-to-port, multimodal, hydrogen and/or electric refuelling corridors across our region. Many of these corridors are identified within the Strategic Development Corridors defined within TfN's Strategic Transport Plan.	Pre-2025	Supporting	Supporting freight information democratisation schemes.	Working with and influencing Government to support information democratisation schemes that make the latest information on the best efficiency schemes and technology available to everyone.	Continuous
Supporting	Facilitating large ZEV truck trials in the North.	Work with Local Authority partners and National Highways to facilitate large Zero Emission Vehicles (ZEV) truck trials in high traffic corridors in the North.	Continuous				

9. Road freight interventions and measures

Potential road freight interventions range from road freight policies focused on air quality, decarbonisation, safety, and efficiency, to physical improvements of the road network infrastructure. This section examines each of these areas and pulls, where appropriate, on a number of the undertakings within TfN's Transport Decarbonisation Strategy to ensure that both strategies are completely aligned.

9.1 Potential detailed road freight policies and measures

- A thorough assessment is recommended on air quality across the TfN region to measure the adverse impact that the increasing number of freight movements is likely to have on the Northern population.
- Work with Local Authorities to facilitate innovative urban delivery trials focused on the use of active and electric modes to deliver parcels in the urban environment (cargo bikes, e-cargo bikes, portering).
- Work with Local Authorities to assess the opportunity of introducing consolidation centres (ranging from micro to regional consolidation centres) to reduce the number of freight trips in urban centres, where air quality and congestion is particularly challenging.
- Assessment of current HGV parking provision and provide suitable parking sites to meet the current and future demand (ensuring futureproof solutions in line with alternative fuels uptake).
- Examine the potential of introducing HGV only lanes on strategic road corridors.
- Detailed data collection of freight movements at corridor level but also in urban centres.

- Work with and influence Government to support information democratisation schemes that make the latest information on the best efficiency schemes and technology advice available to everyone.
- Work with Local Authority partners and National Highways to facilitate large ZEV truck trials in high traffic corridors in the North.
- Support partners to aggregate large orders of ZEV vans and trucks across the North, to signal to manufacturers that the regional demand is present.
- Explore the potential for our partners (ports, Local Authorities, and delivery authorities) to work together to deliver effective port-to-port, multimodal, hydrogen and/or electric refuelling corridors across our region.
- Research on appropriate place-based, low carbon, urban freight (last-mile) solutions in the North.
- Support a pan-Northern hydrogen transport refuelling study, providing a 'look-ahead' as to what an effective refuelling network would look like, to be used as evidence by policy makers and freight operators in their investment decisions.
- Engage with emerging hydrogen partnerships in the North to support the development of a viable business case for hydrogen for first mile freight applications and provide confidence to the supply chain.
- Develop a regional ZEV charging framework, including coverage of the Major Road Network and interaction with local needs and networks. This includes consideration of the needs of cars, vans, and HGVs.
- Increase awareness of fuel-efficient driving styles.



9.2 Road freight decarbonisation

TfN's Transport Decarbonisation Strategy states that:

- 1** In order to shift towards Zero Emission Vehicles (ZEV) TfN should invest in technology demonstration projects to provide evidence for the feasibility of different HGV technologies and the necessary infrastructure to support them. Specific measures include:
 - Develop a pan-Northern, low-carbon charging infrastructure plan, to ensure effective consideration of longer, trans-boundary road trips; including consideration of a charge point procurement framework for use by partners and the identification of optimal locations for high-power charging hubs across the North, with input from Local Authorities and the Distribution Network Operators (DNOs);
 - Work with Local Authority partners and National Highways to facilitate large ZEV truck trials in high traffic corridors in the North; and
 - Work with Local Authorities and freight stakeholders to help aggregate large orders of ZEV vans and trucks across the North.
- 2** TfN will work with the Government to support information democratisation schemes that make the latest information on the best efficiency schemes and technology, available to everyone.
- 3** Through TfN's policy positions and communication and engagement activities, TfN can work with partners to increase public awareness of fuel-efficient driving styles and the associated environmental and financial benefits.
- 4** Undertake or support a pan-Northern hydrogen transport refuelling study. Provide confidence to users about the future path of the technology, in particular with regards to priority application, such as hard to electrify rail services and long-haul HGVs.
- 5** Develop and support partnerships to consider port-to-port, multimodal, zero carbon freight corridors, optimising the economic benefits that our freeports and clean maritime clusters can generate for our region.

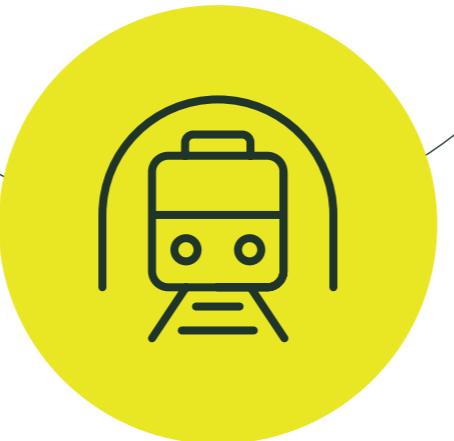
9.3 Physical solutions to enhance the road infrastructure

The list of major road schemes identified in TfN's Investment Programme consists of highways improvement schemes to enhance strategic connections across the North, and to improve the capacity, connectivity, resilience and access to major conurbations, economic centres and industry and logistics clusters, international gateways and intermodal terminals across the region to support economic growth and competitiveness of the Northern region. These include A1 and M6 connectivity and dualling schemes, port access work both locally to the ports and wider connecting infrastructure such as the A66 and A1079 and river crossings, access to airports such as Carlisle Lake District and Liverpool John Lennon, M62 improvements which currently connect warehouse clusters, and improvements that connect the North to other areas such as the A15 into Lincolnshire and the A19.

The road schemes proposed in TfN's Investment Programme provide a significant contribution to addressing the network issues identified in the TfN Strategic Development Corridor studies. The suite of schemes aims to improve the east-west and north-south transport connectivity, particularly in terms of journey time reliability and capacity, vital to link relatively closely located Northern economic clusters.



10. Key rail inventions



10.1 Network locations recommended for further analysis

Like road, there are a number of rail freight investment schemes and programmes highlighted within the TfN Investment Programme. These include port-related gauge enhancements and access for the Port of Hull, Port Salford, Liverpool and Teesport, as well as reference to warehousing development sites such as Parkside. Additionally, there is reference to WCML enhancements and the need for a gauge-cleared route along the east-west axis across the North.

The need to understand the Castlefield corridor and the northern section of the East Coast Main Line, including the need for potential line re-openings to reduce congestion, are also included.

Further work to address the needs for the schemes and programmes highlighted above is referenced within the recommendations of the strategy and will form a key part of the required work we undertake across TfN as we progress.

Specifically identified schemes within the rail network from both the TfN Investment Programme and other funders such as Network Rail include:

- Trans-Pennine gauge-cleared east-west route to the ports
- Sheffield area capacity improvements
- Castlefield corridor and Trafford Park
- East Coast Main Line capacity
- North East freight enhancements (passing loops and port connections)
- Selby to Port of Hull gauge and journey time improvements
- Port of Liverpool to WCML enhancements
- Parkside enhanced freight connectivity
- WCML freight enhancements
- Port Salford rail freight enhancements

We call for electrification of sections of the network to support increased rail freight movements to be delivered sooner. These locations include the freight diversion routes from the ECML via Lincoln and Selby which would benefit from electrification. Similarly on the MML via Corby and Toton which would also benefit from electrification from a rail freight perspective. Additional east-west connectivity for freight should also be examined to facilitate mode shift where possible.

10.2 Express logistics – Parcels on rail

The rail freight sector is experiencing an uplift in freight services from new market entrants, and express logistics is a new entrant that presents an exciting opportunity to further support rail freight growth. With socio-economic trends towards urban repopulation, same-day delivery, increased online spending activity, and urban convenience grocery retail formats, demand for the delivery of consumer goods into urban areas is growing. Overlaying this with increasing concerns over urban air quality, and road congestion, there is an opportunity for the development of a rail haul offer for consignments of parcels and light cargo directly into urban areas.

Express logistics comprises the movement of parcels traffic and its operations can take various modes which can be categorised as:

- Space on passenger trains: where capacity allows, passenger services will provide dedicated space for parcels traffic directly into the station terminus.

→ Dedicated train into station: passenger rolling stock will be converted to accommodate parcels traffic to provide a logistics solution directly into the station terminus.

→ Dedicated train into distribution centres: converted passenger rolling stock will operate directly between depots.

High speed logistics can use passenger stock, therefore growth within the sector should focus on opportunities to convert former and current passenger rolling stock to safely transit roll cages, parcels, mail sacks, and pallets. Express logistics traffic is often time-sensitive and therefore customer expectations dictate that next-day delivery and delivery tracking technology must be incorporated into the rail freight offer.

A unique aspect of express logistics in the rail freight sector is that parcel traffic can be delivered directly into stations located in urban centres; therefore, any future developments of stations should consider the provision of facilities for express logistics such as handling roll cages or providing on-site sorting facilities and collection areas. Express logistics typically operate using electric traction, therefore continued investment in electrification of the rail network is integral to supporting growth in the market and facilitating operations to additional locations.

Ongoing investment by freight operators to repurpose passenger units to accommodate parcels traffic highlights the likely growth in this market. Various trial services have been undertaken, emphasising the opportunity to increase rail's share in this market and introduce new customers to rail freight.

11. Warehousing and terminals

One issue that has become an issue of greater importance is the requirement for warehousing and additional terminals that are connected to highway, rail, and inland waterway networks where possible. There is a shortage of freight warehousing caused by changes to the type of goods being carried and logistics operations more generally. This means that there is less demand for bulk industrial goods to be moved by road and more demand for more local distribution centres. These will house things like food shopping and items people order more frequently to reduce the journey times between the warehouse and the person who has bought the item. This is causing increasing levels of warehouses being rented. Without increasing the availability of this warehousing, economic activity risks moving to locations where the rental price and locations are right but the journeys the delivery vans make will be longer.

Amazon has invested more than £23bn²⁸ in UK markets in warehouse and fulfilment centres over the last 10 years. This has caused significant changes to the road use around those areas, something that Amazon has noticed. As future plans are developed, we are aware of and

support initial testing of rail connections to some Amazon sites and the growth in the electrification of their fleet of delivery vehicles.

We will continue to watch and learn about the impact such large companies have on areas within the North and use this knowledge to recommend the shape of future growth to the best of our ability.

However, if TfN were to support investment in new warehousing through policy and other interventions as a stand-alone initiative this would risk only entrenching existing highway freight modal dominance. Therefore, we will work with Local Authorities in support of greater logistics warehousing but also seek that such warehousing should, by default, be also rail connected where possible and appropriate for the nature of the business. This will be a challenge for the market but, as has been seen in recent developments at iPort Doncaster and with Kraft-Heinz, there is a market-led appetite for modal shift to and from warehousing locations. This policy recommendation will be reviewed once the future of the planning regime is published by Government.

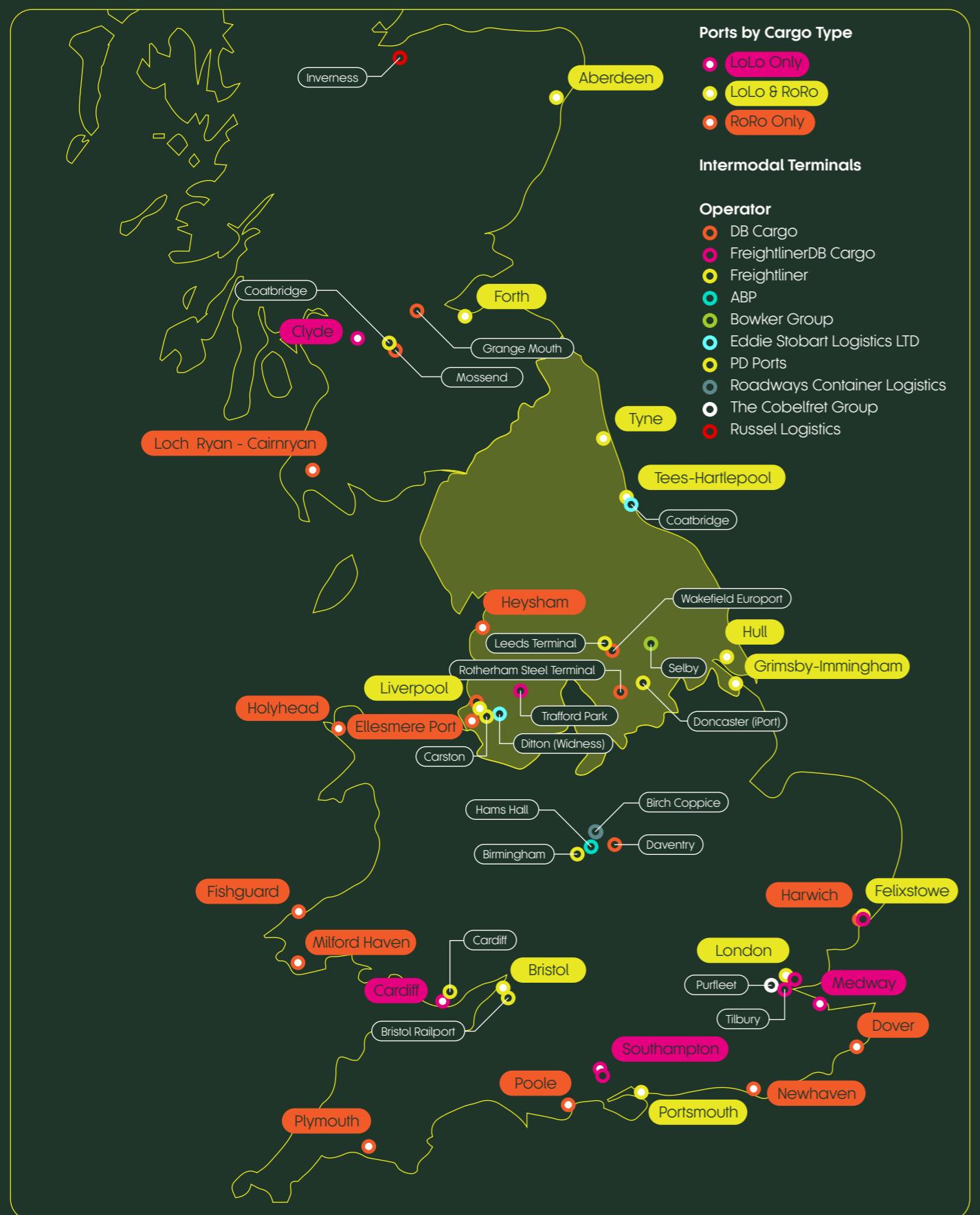
In addition to the local capacity issues at Trafford Park there is a need for more terminals across the North. This has been strongly advocated for in the literature review and by the private sector and TfN partners.

In future, with the modelling capability we are growing at TfN we would be in a strong position to work with Local Authorities to advise on the best location for rail and waterway connected terminals and offer technical support. TfN will consult with Local Authorities so such developments are supported across the North and not just by. Given TfN's position as an STB and our links to partners and other private sector organisations, it would be a natural role for us to take.

There is anecdotal evidence of planning permissions for intermodal terminals being sought for sites where the rail element was challenging to deliver. TfN's technical advice could be used to support Local Authorities who wish to ensure that they do not grant planning permission for rail connected terminals where the railway network cannot be easily used.



Figure 5: Freight terminals and port locations



There are terminal capacity constraints at certain locations in the North, most notably for intermodal terminals in the North West. There is currently no intermodal terminal in the key NW Regional Distribution Centre (RDC) cluster around Wigan and Warrington. Parkside will provide part of the answer if Phase 2 goes ahead, but at least one more Strategic Freight Interchange (SFRI) will be needed, ideally in the Warrington area. Port Salford serves the Greater Manchester area, and it is important that it can be served by trains to/from the east coast, which current plans - with only a west-facing connection - do not cater for. There is also a case for an intermodal terminal at Castleton to serve the lesser distribution centre cluster north-east of Manchester. There is less pressure on terminal capacity in Yorkshire, but there is strong strategic logic in creating a terminal in the Ferrybridge area that could serve the rail and road network as well as the Aire & Calder Navigation.

TfN supports exploring all these options and will work with Local Authority partners to seek opportunities to create new intermodal terminals where possible. TfN also calls for the establishment of a regional Freight Facilities Grant (FFG) to assist businesses in the North connect their facilities to the rail and inland waterway networks - there are several such schemes in the offing, in both the bulk and consumer goods sectors. FFG is used to very good effect in Scotland, and this should be replicated in the North.



12. Freight Future Scenarios

The strategy so far has been developed using suites of existing evidence and analysis. We have ambitious plans to grow and improve the modelling and analysis capability within TfN to support and develop the way we build business cases.

The following sections detail how we will mobilise the activity. Using TfN's Future Travel Scenarios as a starting point, we have undertaken further work to produce forecasts of freight movements associated with potential changes in future land-use, economic growth, and different policy outcomes.

12.1 Evidence of Freight Future Scenarios

TfN commissioned MDS Transmodal (MDST) to undertake a Freight Future Scenarios study in 2020. The study takes the land use and qualitative definitions of individual scenarios specified by TfN and applies them within the Great Britain Freight Model (GBFM) to provide quantitative assessments of the distribution of economic activity, economic growth, road network performance, and technological take-up.

The freight measure options that are used to structure the assumptions of the four future scenarios include:

- Carbon pricing, which reflects a policy environment that encourages the use of "greener" transport and leads to differential increases in fuel costs across modes;
- Road pricing, which leads to increased road costs, varying by road type;
- Autonomous vehicles, which leads to differential rates of uptake through time across modes generating mode-specific reductions in vehicle operating costs;

- Warehousing, which defines whether or not new warehousing location is increasingly concentrated around railheads in the future;
- Brexit impact, which means additional costs of trading with the EU on customs checks, cabotage and drivers' wages; and
- Larger ships, showing the trend towards larger vessels especially on longer sea crossings.

Population growth differs by area type to reflect different spatial planning measures seen across our four TfN Future Travel Scenarios. The scenario known as Prioritised Places has the highest growth in rural areas, indicating a fair redistribution of economic activities across all types of areas. The assumptions made for employment, GVA and population growth are all specified by TfN and consistent with the Future Travel Scenarios assumptions

Key findings from the study are:

- Road is likely to continue to be the most heavily used freight mode in the UK, however, all four Freight Future Scenarios have shown a certain degree of mode shift from road to rail compared to the current baseline situation. Just About Managing sees a future that is led by markets without much increase in political direction, and economic growth continues at a moderate rate. It therefore has the least mode shift among all scenarios.
- Digitally Distributed is driven by technical advances and has a high uptake of autonomous vehicles. Freight takes advantage of lower road operating costs and therefore has the second-least mode shift from road to rail.
- Urban Zero Carbon is led by attitudes to climate action and urban place-making. It sees Government policy in embracing publicly available transit and active modes, and therefore shows the highest mode shift to rail.



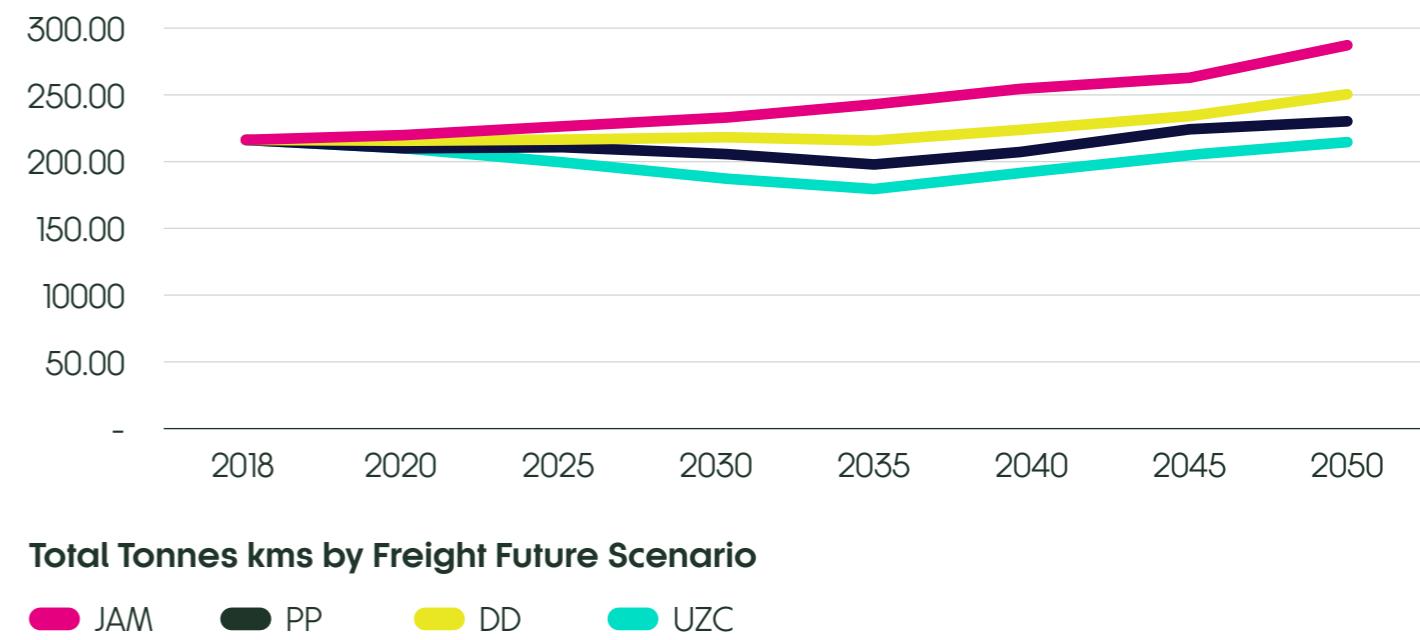
Figure 6 provides a summary of key observations from the freight scenarios modelling work. In comparison to a 5.9% rail tonnes kms mode share in 2018, Just About Managing, Prioritised Places, Digitally Distributed and Urban Zero Carbon have a rail mode share of 6.2%, 12.7%, 7.7% and 14.8% respectively for year 2050.

Figure 6: Freight Future Scenarios modelling output summary, Year 2050

Population	Road Pricing and Land Use	Autonomous Vehicles	HGC PCUs	HGV PCU kms	Tonnes	Tonnes kms	Rail modal split
2018	-	-	-	-	-	-	5.9%
JAM	+	Neutral	Moderate	● 7.4% ● 33.7% ● 6.1% ● 31.1%			6.2%
PP	+	Non-user costs added to user costs and rail based land use	Low	● 9.4% ● 11.7% ● 7.1% ● 13.7%			12.7%
DD	++	Neutral	High	● 8.7% ● 23.1% ● 6.7% ● 20.8%			7.7%
UZC	++	Non-user costs added to user costs and rail based land use	Moderate	● 10.5% ● 5.9% ● 7.6% ● 9.4%			14.8%

2018 - 2050 output analysis

Figure 7: Total road freight tonnes kms for all Freight Future Scenarios



Total Tonnes kms by Freight Future Scenario

● JAM ● PP ● DD ● UZC

- Figure 7 provides a summary of rail freight tonnes demand by commodity category. It shows a significant growth in intermodal rail freight demand particularly in scenario UZC. This is due to several assumptions favouring rail over road in this scenario.
- Likewise, there is a large growth in construction materials demand in scenario UZC. This is also due to the rail-favouring assumptions made for this scenario, and an assumed growth in the market as the market sees an increase in the use of "super-quarries" carrying aggregates over long distances by rail, at the expense of local quarries typically served by road.
- Catering for this rail freight demand would take a large investment in terminals and wagons and would require sufficient capacity to be available on the network.

**Figure 8: Rail freight tonnes demand by commodity category
(annual million tonnes)**

	2016. 2017	2035 1_JAM	2035 2_PP	2035 3_DD	2035 4_UZC	2050 1_JAM	2050 2_PP	2050 3_DD	2050 4_UZC
Intermodal	19.07	28.67	71.6	35.0	84.84	39.1	98.69	46.59	115.17
ESI coal	6.28								
Biomass	6.47	7.52	7.56	7.75	7.74	7.52	7.61	8.10	8.05
Waste	1.23	1.23	1.22	1.25	1.25	1.23	1.22	1.28	1.29
Construction Materials	23.55	22.19	41.97	31.99	42.01	35.41	58.16	41.25	60.52
Spoil (construction)	0.74	0.44	1.30	1.06	1.30	1.12	1.66	1.35	1.69
Petroleum	4.71	4.71	5.30	5.04	5.42	4.92	5.42	5.27	5.64
Chemicals	0.90	0.88	1.05	0.98	1.09	0.94	1.10	1.05	1.17
Industrial minerals	1.34	1.18	1.85	1.56	1.87	1.48	1.92	1.71	1.97
Metals	7.44	6.94	9.86	7.84	10.08	7.99	10.09	8.64	10.57
Automotive	0.45	0.48	0.55	0.52	0.59	0.50	0.55	0.53	0.60
Iron ore	4.26	4.26	4.28	4.39	4.39	4.26	4.30	4.59	4.58
Coal other	1.95	1.95	1.96	2.00	1.99	1.95	1.96	2.06	2.05
Other	0.33	0.41	0.44	0.43	0.46	0.42	0.44	0.44	0.47
Empty returns for containers carrying bulks	0.41	0.42	0.44	0.43	0.46	0.42	0.44	0.44	0.47
Engineering	6.66	6.66	6.65	6.71	6.71	6.66	6.65	6.78	6.78
Total	85.79	87.92	156.34	107.04	170.46	113.98	200.44	130.09	221.30

Figure 9: Road and rail freight demand for Future Freight Scenarios – M62 corridor

	Tonnes km road	Tonnes km rail	Rail modal split
2018	8,168,354,747	41,336,675	0.50%
2035 JAM	8,372,585,961	56,554,386	0.67%
2035 PP	9,208,706,338	149,326,691	1.60%
2035 DD	8,515,862,272	58,151,472	0.68%
2035 UZC	9,329,308,134	177,979,248	1.87%
2050 JAM	8,402,562,014	60,600,598	0.72%
2050 PP	9,532,439,376	245,551,796	2.51%
2050 DD	8,622,432,842	63,378,171	0.73%
2050 UZC	9,807,220,365	295,309,568	2.92%

- Taking the M62 corridor as an example, 8 shows a summary of road and rail tonnes kms for each Freight Future Scenario.
- With limited rail freight network and facilities, rail freight mode share is dramatically low. There is also no opportunity for a greater mode shift from road to rail. It implies that without adequate rail infrastructure in place, there would be relatively limited space for the exogenous policy interference to take effect for the purpose of encouraging model shift from road to rail.

13. TfN Freight modelling and analysis

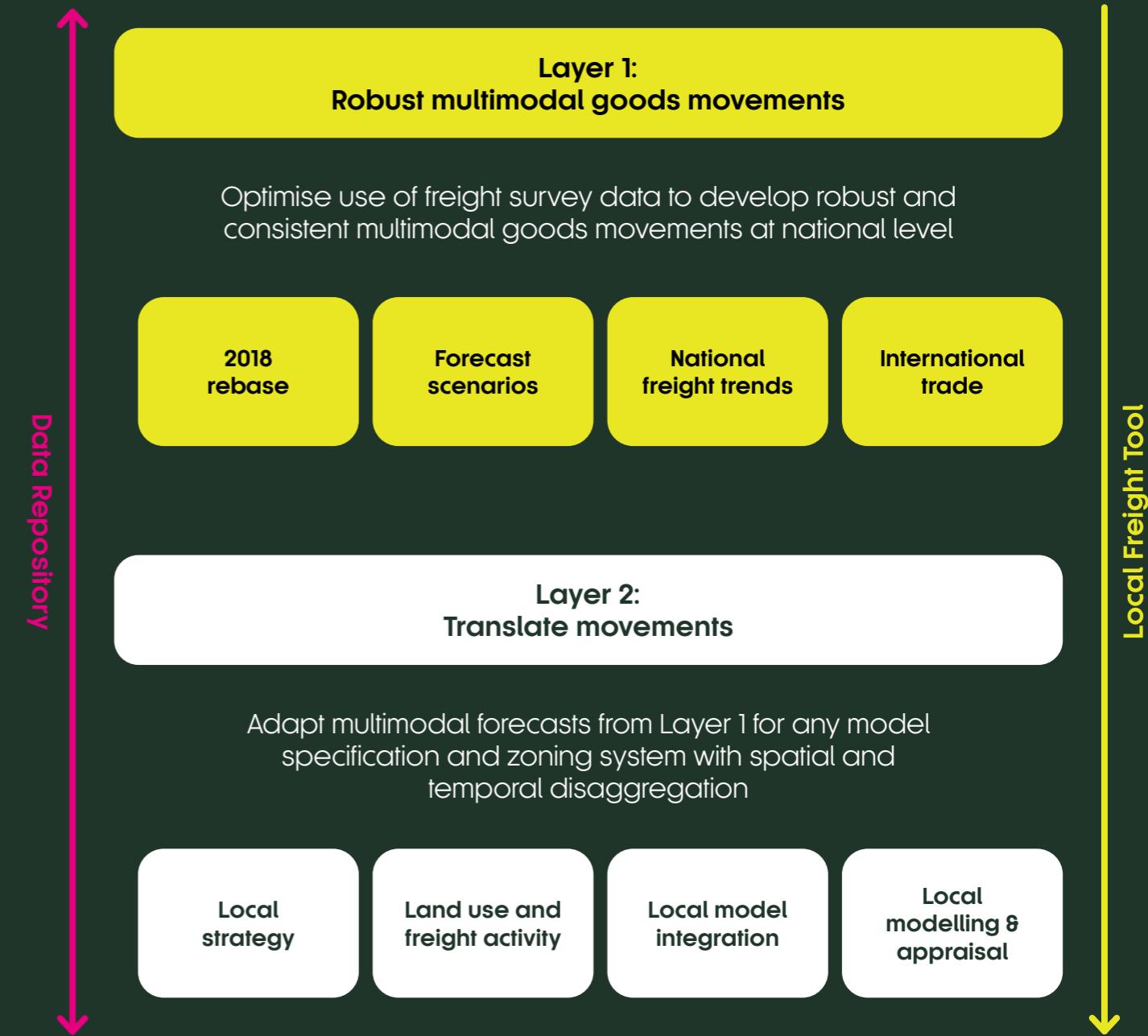
13.1 Freight analysis strategy

TfN has been developing the freight modelling and analysis evidence to support the Strategic Transport Plan and Northern Transport Charter. The focus has been to improve the quality of freight data and models, and assess the multimodal freight impacts and the freight factors external to the transport investment.

TfN has been creating an environment for local freight planning, modelling and appraisal, as well as building robust and consistent freight analysis for the North. TfN's Technical Assurance, Modelling and Economics (TAME) team has identified a two-layer freight modelling and analysis strategy as shown in Figure 10.



Figure 10: TfN freight modelling and analysis strategy



Layer 1 focuses on developing robust multimodal annual movements. This layer maps a strong foundation for the local freight analysis for the North. Layer 2 undertakes freight analysis at the regional and below regional level. The freight data and models are integrated with the other TfN Analytical Framework models in this layer to support TfN Investment Programme studies and freight analysis requirements in the North.

13.2 TfN freight analysis

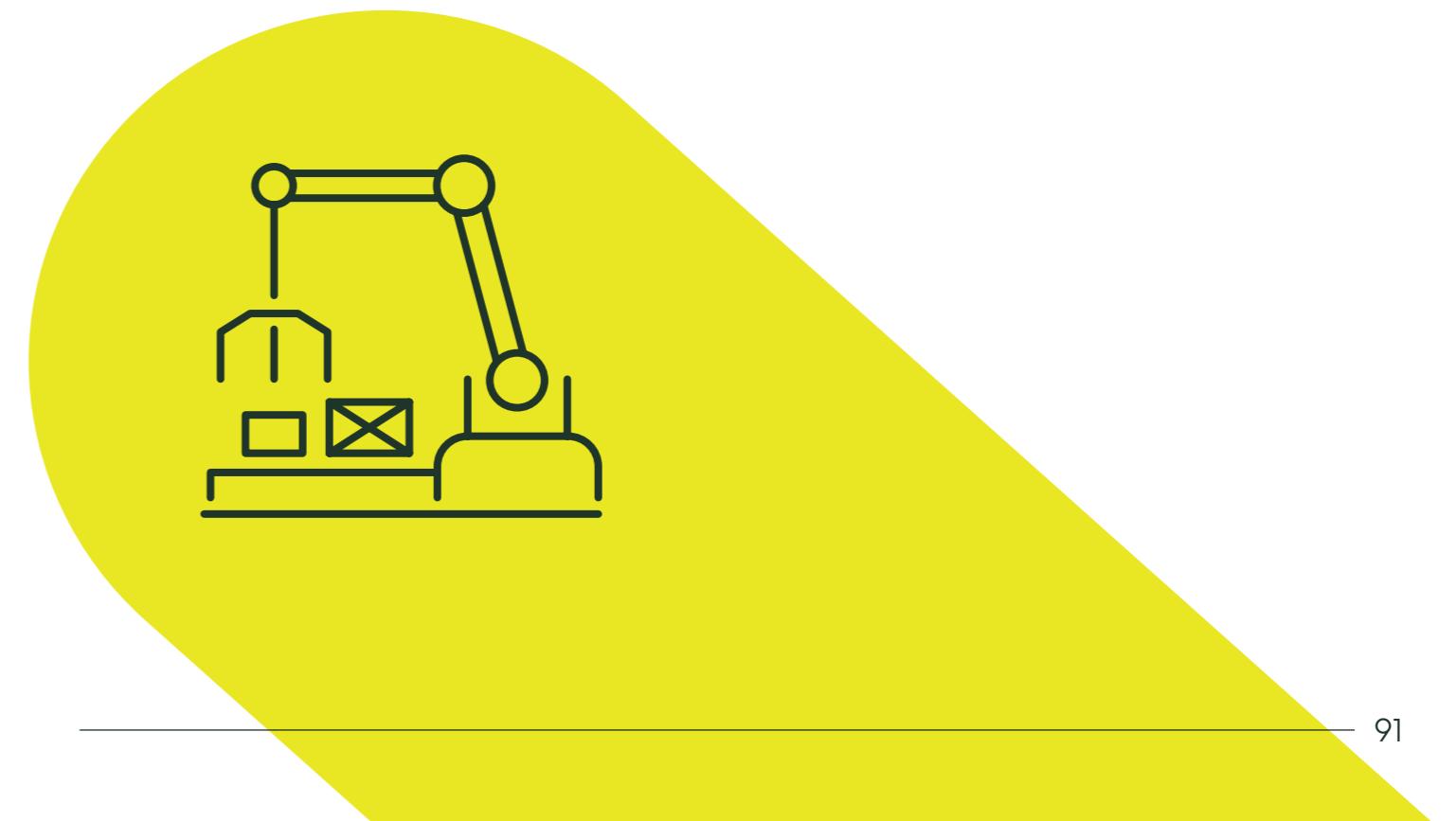
TfN is developing its freight modelling and appraisal capacity and aims to build a holistic freight analysis eco-system to support TfN investment programmes and freight strategy studies. TfN also has the objective of supporting freight analysis requirements from Local Authority partners and other stakeholders, promoting efficiency and collaboration across public sector activities.

The models enable multimodal freight assessment across road, rail and maritime, allowing more focused temporal, spatial and logistical advances to be made. Figure 11 lists the freight models that are used in TfN.

Figure 11: TfN freight models

Model name	Owner	Model description
Great Britain Freight Model (GBFM)	MDS Transmodal	<ul style="list-style-type: none"> → Strategic four-stage freight model → Multimodal (rail, road and water) freight choice model → Inclusion of domestic, European and non-European route choice and demand integration → Capable of comprehensive forecasting scenario testing
Local Freight Tool	Transport for the North	<ul style="list-style-type: none"> → Annual tonnes to local freight traffic conversion by goods vehicle type and road type with spatial and temporal refinement → A dedicated van modelling tool → Dealing with misalignment of forecasting demand between different models → Flexibility of zoning and cost conversion

Model name	Owner	Model description
Freight Meta-Model	Transport for the North	<ul style="list-style-type: none"> → Interpolation of freight forecasting demand for a range of policy query/dimensions → Current policy dimensions include unified change in road cost, population and employment growth and warehousing growth → Current development to take account of potential spatial variations
TfN Freight Data Repository (prototype stage)	Transport for the North	<ul style="list-style-type: none"> → Open-source multimodal freight data collection → Modelled data visualisation demonstrating more detailed spatial granularity → Online and offline data requests



13.3 TfN freight models

In July 2020, TfN commissioned MDS Transmodal (MDST) to deliver a 2018 version of the GBFM model. The model adopted the most up to date input data for road, rail, and maritime, and focused on improving the accuracy of the output data and the robustness of the conversion process used in the model. This new model version is now in use at TfN.

The Local Freight Tool and Freight Meta-Model build an interface to translate the mainline GB freight activities and annual freight demand into a format that can be used for the local freight policy analysis. The Local Freight Tool focuses on improving the spatial and temporal accuracy of the annual tonnage to local freight traffic conversion process. The Freight Meta-Model is a policy scenario testing tool, which interpolates freight forecasting demand for a series of policy dimensions.

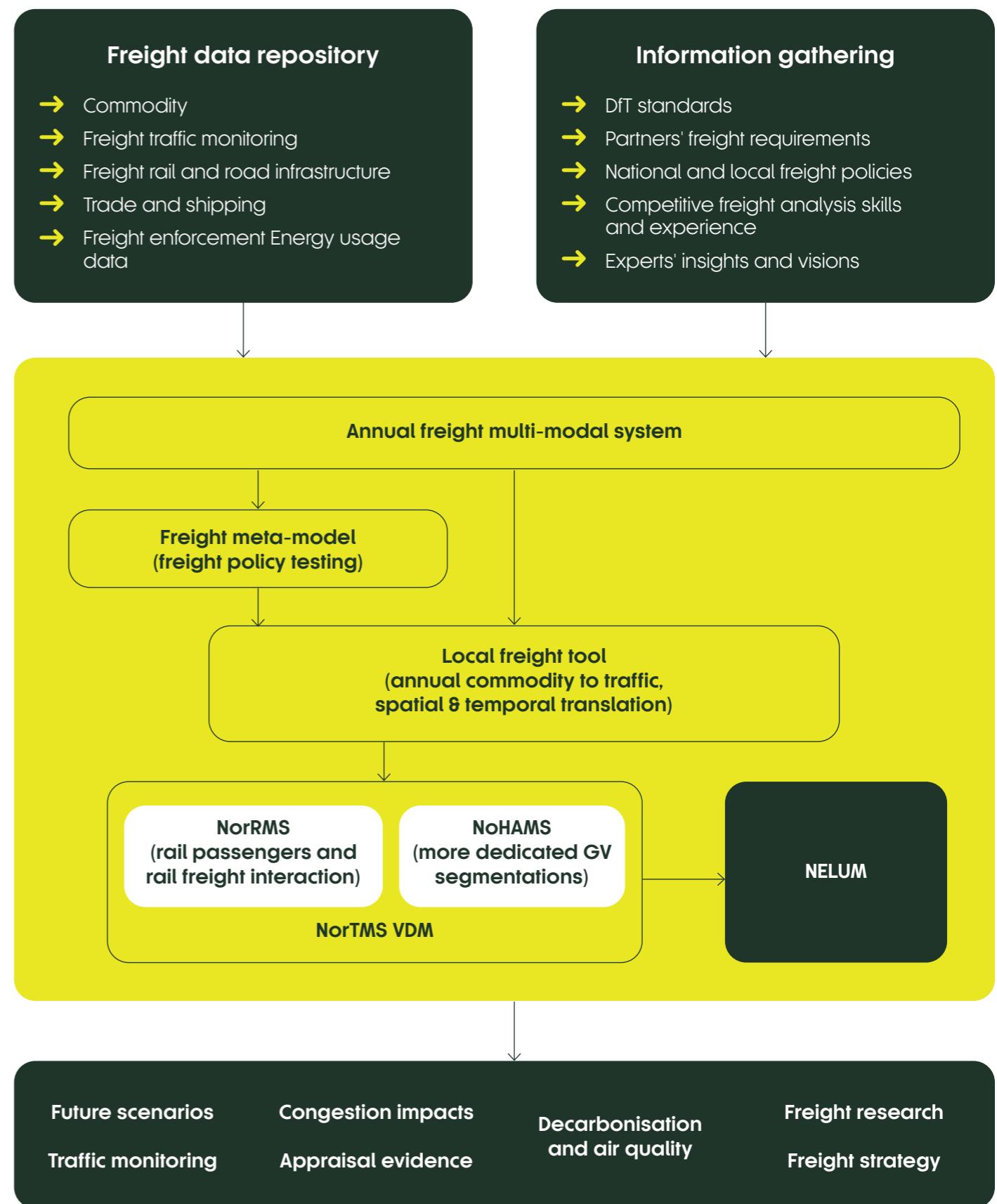
The Freight Data Repository is a collection of structural freight data that is presented in a data monitoring and maintenance system. During the development discovery stage, TfN has identified a number of key freight data challenges, including:

- The general lack of detailed freight data, both in terms of the specific origins/destinations, freight routes taken, position in the supply chain and commodities carried;
- Data ‘patchiness’ and the lack of depth/inconsistency of data across regions, modes and sectors;
- Over reliance on small sample/data set sizes to accurately represent the wider freight system (and deficiencies in accuracy/relevance as result of this in existing key data sets); and
- The lack of consistent data models and standards, and the ability to usefully link data sets between different sectors and freight transport modes.

The Freight Data Repository aims to tackle the freight data challenges, deliver a convenient approach for users to easily search, query and download open source data. The Freight Data Repository also maintains the freight demand and traffic data produced using TfN models. The modelled data provides more disaggregated segmentations in terms of vehicle type, area type, spatial distribution and time profile.

Figure 12 provides a high-level overview of TfN freight analysis operating model.

Figure 12: TfN freight analysis operating model



TfN is working collaboratively with internal and external stakeholders and delivers evidence to support freight economic and environmental studies. Figure 13 provides a summary of TfN modelling and analysis activities. In the coming year, TfN will continuously upgrade its freight models and promote its freight analysis on a wider spectrum. TfN will focus on the freight analysis pipeline being identified through TfN Freight & Logistics Strategy and work closely with partners to deliver multimodal freight business cases.

Figure 13: TfN freight modelling and analysis activities

- Strategic Development
- Corridors Freight Evaluation
- NPR Freight SOBC
- Great Britain Freight Model (GBFM) 7.0 2015
- Freight Modelling and Analysing Strategy
- Ian Williams GBFM Model Peer Review
- TransPennine Tunnel
- Freight Transformational Scenarios
- Local Freight Tool Minimal Viable Product (MVP)
- Freight Meta-Model Stress Testing

Pre-2019

-
- Continuous DfT and Partners Collaboration
 - Support Partners' Freight Analysis
 - Continuously improve the way of Freight Modelling and Appraising Process
 - Promote Freight Model/Data/Knowledge Sharing
 - Promote Healthy Cycle of Freight Analysis, requirement gathering, Freight Policy and Strategy Planning and Governance
 - Use Cases development
- GBFM Model 2018 Rebase
 - Local Freight Tool
 - Freight Meta-Model MVP (freight policy testing tool)
 - Freight Data Repository MVP
 - GBFM Model In-House Services
 - Freight Future Scenarios
 - NPR Freight SOC
 - Freight strategy support
- NPR Freight Partner
 - IFBA freight studies
 - Joining the use of TfN freight tools
 - Continuous GBFM Model In-House Services
 - Stakeholders Collaboration and Freight Data Sharing
 - Investigation of Integrating Freight Tools with other Analytical Framework models
 - Freight Modelling and Analysis Requirements Gathering
 - Support freight strategy work plan

14. How will we deliver this Freight & Logistics Strategy?

The role of TfN is to provide statutory advice to Government on key investments in infrastructure related to the North. This strategy sits very much within the spirit of that. However, work on the Northern Transport Charter by the TfN Board outlines the vision that would enable TfN to have a greater role in decision-making and funding allocation.

TfN will continue to be active in the right places to support the development of freight and logistics programmes of work that will benefit the North. This involves working closely with the Department for Transport's teams and helping them join up activity where possible. This involves the data and analysis activity, ports and maritime, freight grants, and the Future of Freight.

We will also continue to work closely with Network Rail on securing investment in freight schemes that benefit the North. This includes supporting schemes that provide better access to the North through improving the network that sits outside our boundary. A key example of this is work at Ely that will help improve journey times of flows from Felixstowe to the North West, vastly improving the viability of the journeys made.

Crucially, the freight and logistics outlook for the North is significantly different from that for passengers. There are journeys that travel through the North, those that start, those that end, and those that stay within the North. All these journeys need to be carefully considered so that the experience of freight operators is coherent, smooth, and reliable, to ensure we maximise investment opportunities for the area.

The team working on setting up Great British Railways has already contacted areas of TfN, including for freight. As the organisation is set up and develops, we expect to play a leading role in securing investment for the North of England to ensure the new organisation's name lives up to its ambition.

Work progressing on the Investment Programme Benefits Analysis puts TfN in a sound and powerful position to understand the benefits of how the Investment Programme can be delivered and broadly the best sequence the activity should be done in. There are rail and road schemes within that work that are stand-alone freight schemes.

Work planned by the TAME team at TfN includes looking at how best to appraise a freight scheme using the new tools and understanding we have developed. This will allow stronger strategic cases to be developed in line with the Government's recently reviewed Green Book. It will also help those projects where freight benefits as well as passengers, and will be able to better articulate these, all adding value to the development of stronger business cases that will help drive the levelling up ambition that Government has for the North and the UK.

14.1 Recommendations and governance

This strategy has outlined a number of challenges and potential interventions that TfN could support in order to ensure that the freight and logistics network to, from, through, and within the North can be enhanced and realise its full potential.

Once agreed by the TfN Board, TfN will develop a Freight and Logistics Work Programme which can be used to update Board on progress against delivery of the recommendations and key actions.

The key action points from the strategy driven by the need to decarbonise are:

- Decarbonise road freight through supporting new engine and fuel technologies.
- Improve the efficiency of our road network through targeted interventions to alleviate bottlenecks and improve flows.

- Encourage modal shift from road to rail and inland waterways through:
 - Creation of capacity on congested rail routes through targeted interventions;
 - Promotion of investment in the North's waterways to enable them to meet their potential in terms of the carriage of freight;
 - Supporting the creation of new intermodal terminals at strategic locations, connected to road, rail and waterway networks to allow flexibility of operations through working with Local Authorities to resolve land use planning issues;
 - Calling for a regional Freight Facilities Grant to support the creation of new freight infrastructure and to encourage mode shift;
 - Electrification of key sections of the rail network to enable more rail freight services hauled by electric traction.

- Promote the sector where possible to help alleviate staff shortages.



In more detail, the proposed Freight & Logistics Strategy recommendations to deliver the key actions are:

Decarbonisation

- 1** Ensure the freight dimension is advocated strongly within the strategic and economic cases of the Investment Programme. This work will add value to the decarbonisation of road and rail freight in light of delivering progress on the TfN Transport Decarbonisation Strategy Action Plan. TfN is continuing to improve methods for appraising user and non-user benefits that freight brings to the economy. This includes partner led schemes – adding support where required.
- 2** Undertake detailed consultation to understand the demand forecasts within the business case for the Transpennine Route Upgrade as outlined in the Integrated Rail Plan which includes freight gauge enhancement and that the network capacity for the forecast extra traffic is reserved.
- 3** Support the developing approach to decarbonising rail freight as outlined in TfN's Transport Decarbonisation Strategy. This includes working with Great British Railways, freight operating companies and train operating companies to ensure:
 - a. We understand the need for incremental electrification of freight.
 - b. We influence Government to fund a core network for electrification (including freight paths and the need to electrify node to note (such as into ports).
 - c. There is sufficient capacity to allow freight traffic to run directly from origin to destination and with minimum dwell times in loops and on the network, reducing emissions from existing diesel trains.
 - d. That there is ongoing and successful development of alternative low carbon technology for freight locomotives with support from national Government.
- 4** TfN's Transport Decarbonisation Strategy has a key action to facilitate and develop partnerships to achieve port to port zero-carbon multimodal corridors. We aim to capitalise on two areas: the freeport status of a number of our ports and the tax and customs benefits the status brings to the ports and their hinterlands, and the potential to both produce and use green fuels in these locations for fuel intensive industry clusters but also for the first mile freight that flows out of and into our ports including HGVs, rail and maritime. We will liaise with industry to develop the best model for this with initial discussions with the Northern ports and existing clean growth partnerships.

Capacity and capability

- 5** To ensure the Northern Powerhouse Rail programme as agreed by TfN and DfT supports the existing freight traffic and enhances capacity and capability for existing freight and freight growth. This should focus on those route sections where capacity is likely to be constrained which includes the West Coast Main Line north of Golborne, Midland Main Line through Sheffield area, East Coast Main Line two-track section via Durham, and the routes across Manchester. Additionally, it should include areas of opportunity. This may require the development of alternative freight priority routes which would need to be examined closely with industry once the Northern Powerhouse Rail routes are agreed to ensure existing rights remain unaffected
- 6** Underpinned by detailed analysis from the TAME activity, develop a suite of policy related interventions relating to air quality, impacts of urban delivery on consolidation/distribution centre locations, overnight lorry parking provision, detailed understanding of road freight movements including vans, heavy and light good vehicles and smart motorways, micro-consolidation, green shipping options, multimodal hubs, freight efficiency and use of e-cargo bikes and future uses of infrastructure. This will support and further the Northern element of the DfT's Future of Freight work.

Multimodal connected warehousing

- 7** To develop policy levers that support the development of new freight warehouse location clusters in the North. Particularly,
 - a. Where there is more detailed forecasting of the warehousing market across all modes showing opportunity for the North.
 - b. Where such terminals are rail connected.
 - c. Where such terminals are not on the same rail line as Trafford Park or existing rail terminals to increase the opportunity for modal shift from road haulage to rail.
 - d. Where land use conflicts exist, such as availability of lorry parking and rest facilities, work with national and local partners to mitigate this through the planning and delivery of such facilities and the provision of appropriate refuelling networks as required to meet net zero carbon.
- 8** Develop plans for recommended locations for rail connected warehousing working alongside partners and their emerging timescales for Local Plans with particular recognition of any changes to the planning regime soon to be implemented.

National activity

- 9 Work across the TAME and Strategy teams at TfN with the Department for Transport in developing the Data Discovery project. This will encourage data democratisation which will lead to increased levels of freight efficiency and reduced emissions and will enable partners to access more freight data that will strengthen and enhance business cases that include a freight and logistics element.
- 10 Remain actively engaged in using and analysing emerging evidence of the effects of Brexit, Covid-19, and other recent economic shocks. Understand and communicate how this affects the movements of freight on an east-west and north-south basis, how demand for and access to ports changes, and potential change in uses of freight terminals including distribution centres. This should then be utilised in business case development and the revised TfN Strategic Transport Plan, due to be published in 2024.



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Transport for the North

2nd Floor
4 Piccadilly Place
Manchester
M1 3BN

0161 244 0888
info@transportforthenorth.com

