Scotland's rail infrastructure

The rail industry's advice for 2019 onwards

Rail Delivery Group

National Rail · BRITAIN RUNS ON RAIL

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Rail Delivery Group

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Foreword

Scotland's railways are key to supporting the Scottish economy and enabling its communities to flourish. This advice responds to the Scottish Government's consultation on future rail infrastructure in Scotland and sets out choices and a framework to continue contributing to growth and prosperity.

The railway in Scotland has grown significantly. The number of passenger journeys has approximately doubled since 1998, and this growth has been supported by the Scottish Government's investment in new lines and infrastructure, new stations and new trains. Whilst rail freight in Scotland has been adversely affected by Scotland and the UK's move towards becoming a low carbon economy, the rail freight industry is working hard to develop new markets and new ways of supporting Scotland's economy.

Working closely with the Scottish Government, the industry has been developing strategies and plans that can deliver service improvements, faster journeys and support continued growth. The Scotland Route Study was established in 2016, and the Rail Delivery Group (RDG) published Investing in the Future in September 2016 to inform subsequent discussions with funders, stakeholders and rail users.

The Scottish Government is due to publish its High Level Output Specification (HLOS) in summer 2017. This industry advice – published by RDG on behalf of the rail industry - sets out both potential choices for Ministers, and how ongoing engagement between industry and government can deliver the best outcomes for both customers and Scotland.

The rail industry recognises that its own success – supported by extensive Scottish Government investment - has created significant challenges and opportunities. These need to be identified and addressed if it is to continue to meet the needs of passengers and freight users.

The industry needs to demonstrate that it has understood and responded to the challenges of recent years. The ongoing investment programme has faced a number of issues, including significant upward pressure on costs. While the scale of this challenge is potentially smaller in Scotland than at a GB level, the industry in Scotland has rightly been subject to increased scrutiny, and this advice reflects the lessons learned and the requirement for further improvement in strategic planning, programme development and delivery.

This advice emphasises the importance of considering Scotland's railways as a system that delivers for passengers, freight shippers and stakeholders. Aligning decisions on train services, rolling stock and infrastructure is the industry's strategy for delivering best value-for-money. It recognises that the rail sector is a system, involving passenger and freight operators, Network Rail, the supply chain, government and wider stakeholders, and that developing a framework that incentivises these groups to work together will be important over the years to come. Opportunities for cross-border passenger and freight services are already being taken forward, and securing the best possible benefits for Scotland from the building of High Speed 2 will be an increasing priority for the rail industry and its partners.

The industry is working in an increasingly positive and collaborative way with the Scottish Government. Building on the trust and transparency that already exist underpins how longer term strategies can be developed and translated into an efficient, high-quality railway that supports the Scottish Government's long-term vision for Scotland.

In the short-term, the industry is focusing on improving train punctuality and performance. Delivering and ensuring that performance meets the needs of users is at the heart of the industry's planning, recognising that there are choices to be made to ensure that more trains and more capacity can be sustained and delivered consistently. This advice recognises that this requires reliable assets and constant focus on operational reliability.

The choices for funders identified in this advice include continuing investment in the network that deliver improved capacity and improved journey opportunities; focusing on making the best use of the current network.

This advice addresses key issues identified in the consultation, integrating the questions posed by Ministers with the ongoing industry engagement and strategic planning processes. It addresses:

- Maintaining and building on the current high levels of safety performance, and what opportunities exist for targeted improvements in both passenger and workforce safety

- Identifying and analysing the performance challenge, and setting out choices and options to meet passenger and freight requirements

- Presenting key choices for investment to enhance the capability and capacity of the network in Scotland, in the context of continued growth and requirements for transport

- Highlighting the role that innovation can play in delivering what rail users and funders want at an efficient cost

Foreword

- Building on the mutual trust that exists between the industry and the Scottish Government, enabling both parties to identify trade-offs that will be required when taking the railway forward.

- Working with the Scottish Government to develop an efficient enhancements procurement 'pipeline' that will increase efficiency of delivery and certainty of cost.

On behalf of the industry in Scotland, the Rail Delivery Group looks forward to working with the Scottish Government to build on this advice.

Jo Kaye   Chair, Planning Oversight Group, RDG
               Director, Network Strategy and Capacity Planning,
               Network Rail

01 Introduction

Scotland's railways are a national asset. They provide a vital public service to people and communities across the country and enable businesses to move goods and materials to markets.
Our railways are a key part of the implementation of Scotland's Economic Strategy, supporting a resilient and growing economy through our four priority areas of investment: infrastructure, innovation, inclusive growth and international engagement. (Humza Yousaf – Minister for Transport and the Islands)

An efficient transport network is essential to support a prosperous Scotland, underpinning inclusive, sustainable growth across the country. Making choices for 2019 and beyond allows the Scottish Government and the industry to identify priorities for the Scottish railway in the medium term. This advice builds on from the 'Investing in the Future' document that the Rail Delivery Group published in the autumn of 2016.

It responds to Ministers' Consultation on Scotland's Rail Infrastructure Strategy, published in November 2016. In setting out this industry's advice it builds on the ongoing strategic planning and development activity across the rail network.

A changing railway environment

The railway has undergone significant change since the start of Control Period 5 (CP5) in 2014. Many of these are direct or indirect consequences of the reclassification of Network Rail as an arms-length government body in 2014, and the responses of both the industry and governments to the issues raised by Network Rail's well-publicised challenges in delivering the enhancement programme for CP5.

These are fundamental in nature, and will take time to deliver future improvements in an industry structure that has been relatively stable since rail privatisation 20 years ago. This advice identifies choices that will allow the railway to respond to the challenges in Scotland and which will support broader economic and social objectives.

A changing political framework

Since the last High Level Output Specification (HLOS) was published in June 2012, the political context in Scotland has changed. The recommendations of the Smith Commission in 2015 included the transfer of significant additional powers from the Westminster parliament to Scotland. This has significantly increased the number of policy levers available at the Scottish Government's discretion, while also increasing the competition for resources across government.

The rail industry recognises that a pound spent on the railway is a pound that could potentially be spent on health and social care services, education or public housing.

Our advice focuses on maximising the potential outcomes that users of the railway and the Scottish Government derive from the railway. In particular, it identifies how the railway can support wider government policies highlighting areas of opportunity and risk associated with different strategies.

Both the industry and the Scottish Government will need to prioritise making best use of the current network. The recently announced 'Revolution in Rail' will transform interurban and regional services across Scotland, and once these investments are in place the industry will seek to maximise their benefits.

The Revolution in Rail programme is an example of how the industry can work together with government. The combination of timetabling changes and rolling stock redeployment will maximise the benefit of infrastructure improvements, and was facilitated by the Scottish Government's willingness to review and update the ScotRail franchise. The revised franchise contract will deliver a significant package of service improvements across the network targeted to meet the needs of passengers.

A framework for future engagement

This advice is intended to be a significant contribution to the development of rail policies in Scotland. The priority of the rail industry is to ensure that the choices it puts forward are flexible enough to adapt to changes in the external environment whilst also ensuring that there is a comprehensive long term vision for the railway in Scotland.

Through an open and collaborative dialogue, the industry anticipates that it will be able to support and deliver the Scottish Government's policies and investment plans, recognising and assisting in ensuring that transport outcomes are targeted towards meeting its broader economic, social and environmental objectives in an innovative and efficient way.

02 Background and Industry Context

The Scottish Government's objectives

The consultation on 'Scotland's Rail Infrastructure Strategy' focuses on delivering a railway that supports the government's vision of building a Scotland that is both wealthier and fairer.

The three foundations of the Scottish Government's objective are:

- Tackling inequality
- Improving competitiveness
- Integrating services.

Supporting Scotland's economy

The Scottish Government's vehicle for delivering this vision is its Economic Strategy, which was published in 2015, and it is currently working to develop its infrastructure priorities for the future to make this vision a reality. The Scottish Government has announced its overall intention to update the National Transport Strategy, which underpins its strategies and policies, including the High Level Output Specification (HLOS), for the rail industry.

Scotland's Rail Infrastructure Strategy consultation

The consultation on Scotland's Rail Infrastructure Strategy focuses particularly on enhancements to the network, how these are developed and how the industry can provide greater certainty on both costs and outputs.

It is in favour of a pipeline approach to developing and delivering enhancements to the network, noting that "much has changed" in the rail industry since the publication of the CP5 HLOS in June 2012. The reclassification of Network Rail and subsequent changes to the way it is funded are highlighted, but it also notes other challenges that have been encountered during the CP5 programme of enhancements, including:

- delivering projects against agreed costs and delivery milestones
- changing roles and responsibilities, including those of the regulator
- a desire for greater decentralisation in Network Rail's central functions, with the transfer of decision making and control away from its historically large corporate centre, particularly in respect of the development and delivery of major projects.

The document concludes by stating that it "is clear that there is now a need to consider alternative approaches to the specification of enhancement projects by government".

In July 2016, Transport Scotland commissioned an independent review of the corporate governance structure supporting Network Rail's delivery of the major rail enhancement programme in Scotland during CP5. This was a response to Transport Scotland's concerns about increasing cost estimates and heightened risks of not meeting previously committed delivery milestones. The findings of this independent review were published in October 2016 with all recommendations accepted by the Scottish Government and Network Rail.

In its Rail Infrastructure Strategy consultation, Transport Scotland proposes the development of a tiered approach to new infrastructure investment, aligned with the hierarchy established in the Strategic Transport Projects Review (STPR). This consists of four categories:

- **Category 1:** Any enhancement projects that require to be carried over from the CP5 programme for completion in Control Period 6 (CP6)

- **Category 2:** Enhancement projects considered essential to maintain a safe, high performing railway. Such projects, linked efficiently with planned renewals works, would be expected to provide increased capacity, improved journey times and/or improved performance at key locations where such outcomes are currently constrained

- **Category 3:** Enhancement projects to support social and economic objectives, including potential new routes, alignments and stations

- **Category 4:** Enhancement projects to increase capacity on key cross-border routes, with joint funding arrangements, and appropriate future-proofing for long-term ambitions including integration with High Speed Rail.

The rail industry supports the pipeline proposal contained within the consultation document. It is consistent with the approach set out in Network Rail's Scotland Route Study published in July 2016 and the Investing In The Future document published in September 2016.

Consultation on Scotland's Rail Infrastructure Strategy

Question 1

'1. Do you agree with our vision and approach? Will they help us to achieve the Scottish Government's purpose of increasing sustainable and inclusive economic growth?'

The rail industry agrees with the overall approach proposed by the Scottish Government. It wishes to continue to work closely with government to develop policies and support investment and delivery geared towards helping the Scottish Government meet its wider economic and social objectives, and meet the expectations of passengers and freight shippers now and in the future.

Economic context: UK and Scotland

The worldwide financial crisis in 2008 affected Scotland in a similar way to - and to a similar extent as - the other constituent nations and regions of the UK. Whilst the depth of the subsequent recession was not as pronounced in

Scotland as it was in other parts of the UK (primarily as a result of capital spending levels being maintained), Figure 1.1 illustrates how the post-recession recovery in Scotland has been slower than some other parts of the UK, most notably London and the South East of England.

There has also been a pronounced difference in economic performance among different regions within Scotland. The focus of the crisis on the financial sector has affected the east of Scotland (which has the largest financial sector in Scotland) hardest in terms of GVA per head. Figure 1.2 highlights how GVA per head in the North East of Scotland was affected less by the crisis, and has consistently outstripped growth in other parts of Scotland.

The economic performance of the North East, however, is heavily dependent on the oil industry, both directly and indirectly. The recent volatility of oil prices, and the anticipated decommissioning of some of the larger oil fields in the coming years is a long term challenge to the prosperity of the North East of Scotland, and diversifying the North East economy is a major focus of both the Scottish Government and of local authorities in the region.
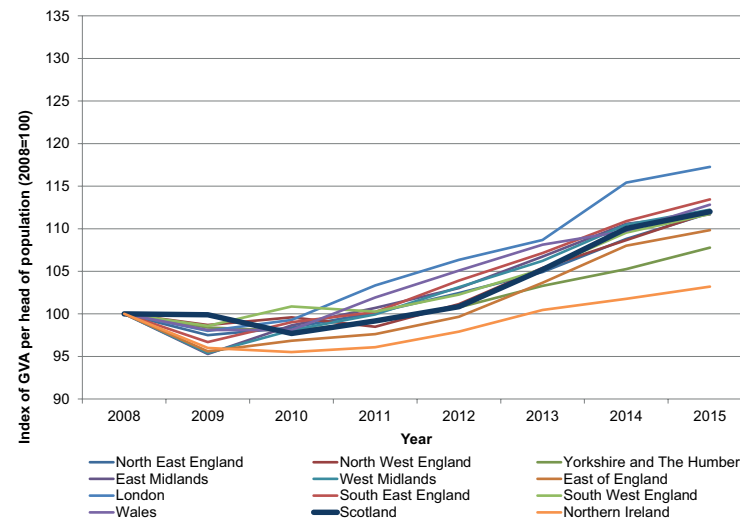

Figure 2.1:- Growth in regional Gross Value Added (GVA[1]) per head (Income approach), 2008-2015, ONS

1   Gross Value Added (GVA) is the increase in the value of the economy due to the production of goods and services
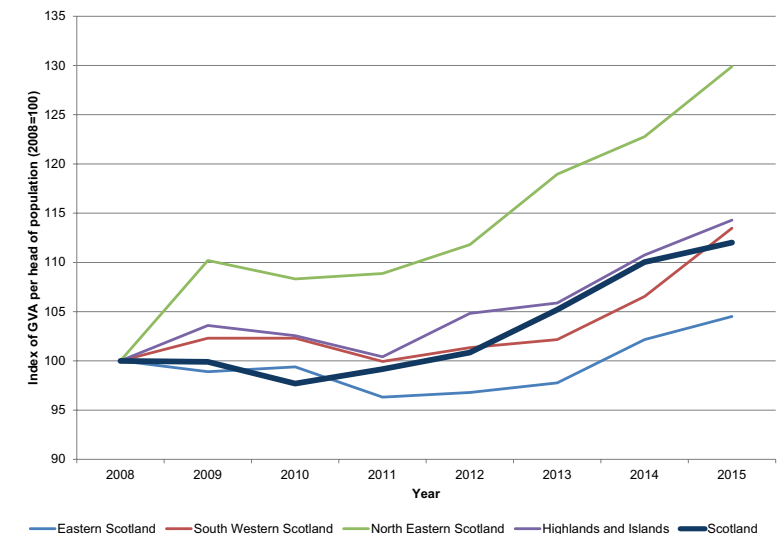

Figure 2.2:- Growth in regional GVA per head within Scotland (Income approach), 2008-2015, ONS

The economy of Greater Glasgow – like much of the Central Belt – has struggled to adapt to the conditions of a post-industrial economy. Unemployment rates (9.5% in Glasgow in 2014) and economic inactivity rates (particularly in the 50-64 age cohort) remain high. A key cause of economic inactivity is poor health: over 30% of those classed as economically inactive in Glasgow were classed as being long term sick in 2014, and in formerly industrial areas such as East Ayrshire and Inverclyde the figure is even higher.

Although Glasgow itself is a major commercial and financial centre in Scotland, the city's economy highlights the dependency of Glasgow on relatively low productivity employment compared with other parts of Scotland, most notably Edinburgh and Aberdeen.

The objective of the Scottish Government's Economic Strategy is to develop local economies across Scotland, including rural areas, focusing on developing the skills base required to support high skilled, high wage jobs, and producing goods that the rest of the world wants to buy. A key requirement of
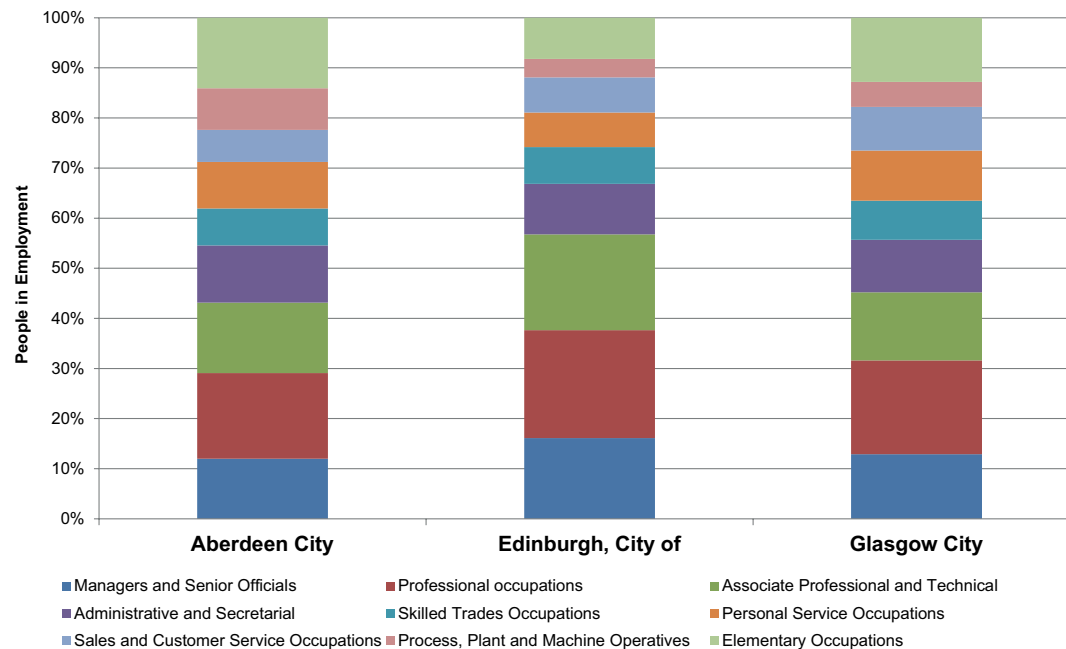
the Strategy is to reverse the historic decline in the size of Scotland's population by encouraging in-migration into Scotland. The aim of the policy is to address the effects of an ageing population, ensuring that public services can be sustained and supporting the country's economic development.

Ensuring that Scotland has a transport system that can support the delivery of the Economic Strategy, with economic outcomes clearly mapped to transport market outcomes, requires an integrated approach to planning from the industry, the Scottish Government and from other potential industry funders.

Challenges from "Brexit"

On Thursday 23rd June 2016, the UK voted in a referendum to leave the European Union (EU). The process and timing to implement the result have yet to be established, and at this stage it is impossible to quantify the challenge that Brexit is likely to create for Scotland.

The principal economic risks as far as Scotland is concerned are related to:

- Impacts of tariffs on the price of imports and exports

- Impacts of exchange rates on the price of imports and exports

- Impacts on private and public sector investment

- Impacts on inward migration.

These can be separated into softer, anticipatory risks (such as exchange rate risks and investment risks) and harder risks such as the impact that increased barriers to trade and reduced migration would have on prices and on economic growth.

Once withdrawal from the EU is formally initiated, some degree of political and economic uncertainty is likely to follow. Consequently, most independent organisations have downgraded their short-term economic forecasts, although the consensus is that the short-term economic impact will not be as deep or prolonged as the 2008 recession.

The impact of Brexit on longer term growth will be affected by many economic and political variables. Some risks will be upside, some downside. Industry planning needs to anticipate a need for flexibility to support the government in achieving its wider objectives.

On the one hand, reduced immigration and increased tariffs on imports into Scotland may reduce overall levels of economic activity, which would reduce the demand for rail travel and therefore reduce rail revenues.

Legend:
- Managers and Senior Officials
- Professional occupations
- Associate Professional and Technical
- Administrative and Secretarial
- Skilled Trades Occupations
- Personal Service Occupations
- Sales and Customer Service Occupations
- Process, Plant and Machine Operatives
- Elementary Occupations

Figure 2.3: Employment composition in Aberdeen, Edinburgh and Glasgow, GROS, 2014

Conversely, the reduced value of the pound may support the growth of Scotland's currently small manufacturing base, food and drink industries and tourism. Opportunities may also arise from the development of different trading relationships outside the EU in the longer term.

Given the level of uncertainty, the industry's working assumption is that economic growth may eventually return to pre-Brexit levels, several years of demand growth could still have been be lost by the time the economy has completely adjusted. In the context of this advice, the challenge of Brexit for the rail industry is to ensure that the industry and government work together to identify and address risks.

The role of the railway in Scotland

Scotland's rail network plays an important role in supporting the economic and social activity of the nation. Passengers and freight users benefit directly from its services, and a well-functioning network is essential to support and complement other modes of transport.

Rail services connect people and businesses to jobs, education, communities and leisure opportunities; rail freight connects businesses to their customers and supports the Scottish economy. The economics consultancy Oxera recently estimated the annual value of the railway to users in Scotland to be approximately £1 billion.

Scotland's rail network requires planning and maintaining to ensure that it can meet current and future user needs. In addition, the rail industry needs to sustain and build upon the improvements that have been made in the safety of the railway for passengers and for its workforce, helping to ensure that the GB railway continues to be one of the safest railways in the world.

Setting strategic objectives for the railway: what is the railway for?

A key finding of the Shaw Review of Network Rail identified the need for funders to provide "clarity about [the] various roles and objectives for the railway". Getting the most out of the railway will require funders to have a long-term vision and a consistent strategy.

There are trade-offs between the volume and scope of the services that can be provided and the reliability that the network can deliver for a given cost and available capacity.

Having an overall vision and strategy for the network does not and should not prevent government taking a more specific corridor-by-corridor view, reflecting markets served and the policy objectives of the funder.

As with all modes of transport, the benefits of rail are broadly proportionate to the number of people who use rail services, where they use them and why they use them. Rail will be most effective where it serves markets effectively and where it has a comparative advantage over other modes.

The railway: A strategic enabler for customers and funders

Whether the railway provides good value-for-money – especially when compared with other transport modes – depends on the social and economic priorities that governments have and on the broader policies they choose to pursue. Understanding the strategic direction of government, and the transport implications of broader policies, is therefore central to the ongoing development of the industry's strategic thinking.

The Scottish Government's Economic Strategy is central: the rail industry is working with the Scottish Government to achieve a common understanding of the transport implications of delivering the Strategy, and will advise how it can drive the future direction of rail policy and investment in Scotland.

Although rail's overall market share across Scotland is relatively low, in many markets it has a fundamental impact on the quality of life of the communities it serves. An efficient and sustainable railway can support a strong and prosperous Scotland.

Passenger growth

Over the last twenty years, passenger demand in Scotland has increased significantly (see Figure 2.5). This trend has been particularly notable for interurban and commuter services into key cities, and for long distance cross-border services.

In Scotland this growth has been enabled by the transport policies of successive governments, which have been highly supportive of rail as a means of supporting transport market objectives and viewed rail as a key instrument of wider governmental ambitions to transform communities and economies across Scotland.

In an economy that is increasingly driven by office-based jobs in city centres, urban rail networks ensure that people can access employment and that employers can attract a high quality workforce. For example, analysis informing the Scotland Route Study suggested that between 1997 and 2014, city centre employment in Edinburgh and its western periphery grew by 18%. Over the same period, rail demand into Edinburgh's key employment districts grew by approximately 122% according to ORR station usage data.

Where families and social networks are increasingly dispersed, and where businesses are increasingly knowledge-based, a well-developed national rail network can help to sustain high quality social and cultural interaction.
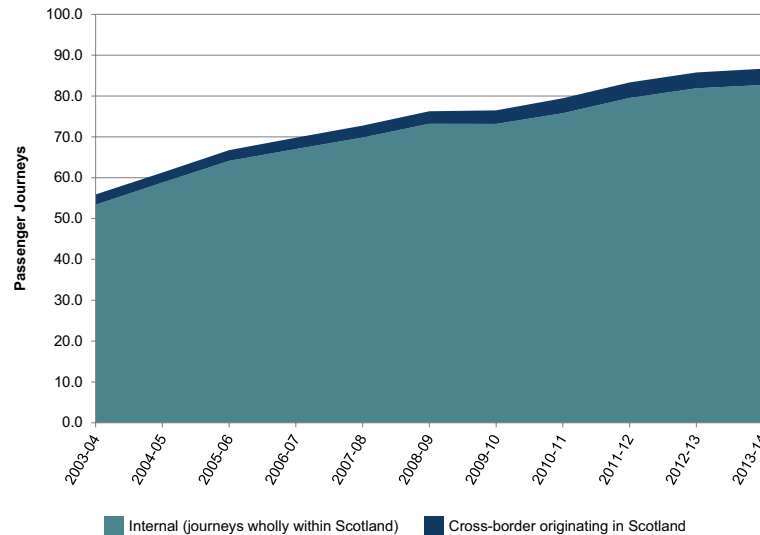

Figure 2.5: ScotRail Passenger journeys 2003-04 to 2014-15

Forecasts of future passenger demand

The Scotland Route Study provides the most recent source of rail forecasting. The forecasts developed for this were based on a series of scenarios reflecting different potential 'futures' for the Scottish economy tailored to the specific characteristics of each market under consideration.

These forecasts are conditional on the underlying economic conditions assumed within each scenario rather than being 'predictive', and were designed to identify the boundaries within which future investment could be planned. They are also unconstrained views of future demand on the network designed to identify choices for funders.

Table 2.1 shows the range of forecasts created for the Scotland Route Study. They vary between shrinking demand in some (but not all areas) in the lowest growth scenario to significant growth in these markets in a high growth scenario.

Market	Additional growth 2012-23	Additional growth 2012-43
Edinburgh Morning Commuter	32% - 51%	12% - 115%
Glasgow Morning Commuter	15% - 39%	-4% - 128%
Aberdeen Morning Commute	20% - 54%	3% - 226%
Interurban	38% - 49%	30% - 197%
Rural	61%	72% - 158%

Table 2.1 A range of passenger growth scenarios from 'Struggling in Global Turmoil' to 'Prospering in Global Stability' for further information please see Scotland Route Study Appendix 2 Market Study

Cross-border rail links are important to the economy of both Scotland and England, providing access to major cities and economic opportunities in both countries. Anglo Scottish services are also part of the wider long distance sector which serves a diverse range of markets including:

- long distance leisure travel (e.g. tourism, visiting friends and relatives)

- interurban business travel

Long distance services also serve some shorter distance markets, for example links between regional centres (such as Berwick-upon-Tweed to Edinburgh). A number of these services operate north and west of Edinburgh towards Aberdeen, Inverness and Glasgow. They provide a dual role of linking these cities with the English centres they serve as well as forming part of the domestic service pattern in Scotland in conjunction with the ScotRail franchisee.

The diversity of the markets that are served presents challenges in balancing market needs, for example in providing stopping patterns which meet local needs, while offering attractive journey times to the longer distance business and leisure markets.

The Long Distance Market Study (2013) also forecast that passenger demand on Anglo Scottish services is likely to increase significantly over the next 30 years, even before assessing the potential impact that High Speed services

are likely to have in delivering growth.

Figure 2.6 [1] indicates that demand on the key flows into Scotland could grow by as much as 27% by 2024 compared to the base demand estimated in 2012.
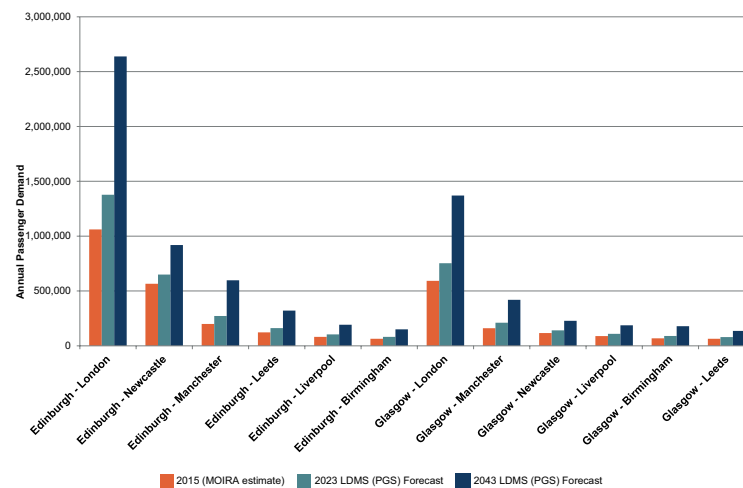

Figure 2.6 : Long Distance Passenger Growth forecast on selected Anglo Scottish Flows, Long Distance Market Study, 2014

Scotland's freight market

Rail's freight markets in Scotland have changed significantly in recent years. These changes have reflected long term trends in Scotland's economy as once-key markets have continued to decline, particularly as a result of changes in the UK's energy markets.

The Scottish Government published "Delivering the Goods; Scotland's Rail Freight Strategy" in March 2016 against the background of decline in coal and steel traffic. It recognised that the freight industry had suffered a major blow and that it would take effort to place the industry onto a sustainable footing again. It committed support for the rail freight industry in working collaboratively to identify new markets and areas for growth and also to invest alongside the industry in whole system solutions and innovations to meet the demands of the modern market.

The faster than anticipated decline in what was Scotland's rail freight bedrock,

1   MOIRA is an industry demand forecasting tool which models ticket sales data to individual train services.

ESI[2] coal, resulted in an almost 50% reduction in freight moved to, from and within Scotland since 2012. This has radically changed the face of rail freight in Scotland from a buoyant industry to one that will require a period of recovery to build up new and sustainable markets. There will be challenges in securing modal shift in some growth markets and this will require both the rail industry and the Scottish Government to adopt new approaches in order to secure the growth that is achievable.

Forecasts of future freight market demand

As noted above, changes in energy generation policy have prompted a period of unprecedented rapid and structural change in rail freight's commodity base. While sensitive to exchange rate and external environment changes – is unlikely to be reversed in the short-to-medium term. The recent Deep Dive Commodity Study commissioned by Transport Scotland and Scotland Freight Joint Board highlights the following potential growth markets:

- **Maritime Intermodal**: sustained demand from shippers for rail hauled deep sea intermodal traffic, bolstering activity on established routes between Central Scotland and deep sea ports. Unconstrained, the number of containers moved by rail could increase by 58% (from 58,000 containers per year to 92,000)

- **Domestic Intermodal**: unconstrained growth of 100% is possible in the number of domestic intermodal containers moved (74,000 containers per year to 148,000 resulting from growth in the existing traffic between the Midlands and Central Scotland, plus new flows from the North West and Yorkshire and short sea feeder volume emanating from east coast regional ports

- **Construction**: rail freight is consolidating its position as the default mode for efficient bulk transit of crushed rock, sand / gravels and cements from source to market. In Scotland the core construction commodity transported by rail is cement, both distributed from the Tarmac production plant at Dunbar and imported into Scotland from Clitheroe. Requirement for new railhead sites, pop up terminals and services will be driven by demands of commercial development across Scotland and investment in the road network

- **Food & Drink**: there is already a service moving a significant volume of bottled whisky by rail for export and rail freight operators are exploring new business opportunities in the food and drink sector

2   Electricity Supply Industry coal

- **Timber**: Scotland has a buoyant timber industry, with forestry and timber processing generating £285 million of GVA annually for the Scottish economy. The unconstrained forecast for modal shift to rail could be 7 million tonnes of timber per annum however given the challenges for rail over existing road and sea shipment the constrained annual forecast figure is likely to be around 1.5 to 2 million tonnes per annum. [3]

The scope for the Deep Dive Commodity did not cover all products being transferred to and from Scotland by rail. However, growth is also forecast in the following commodities:
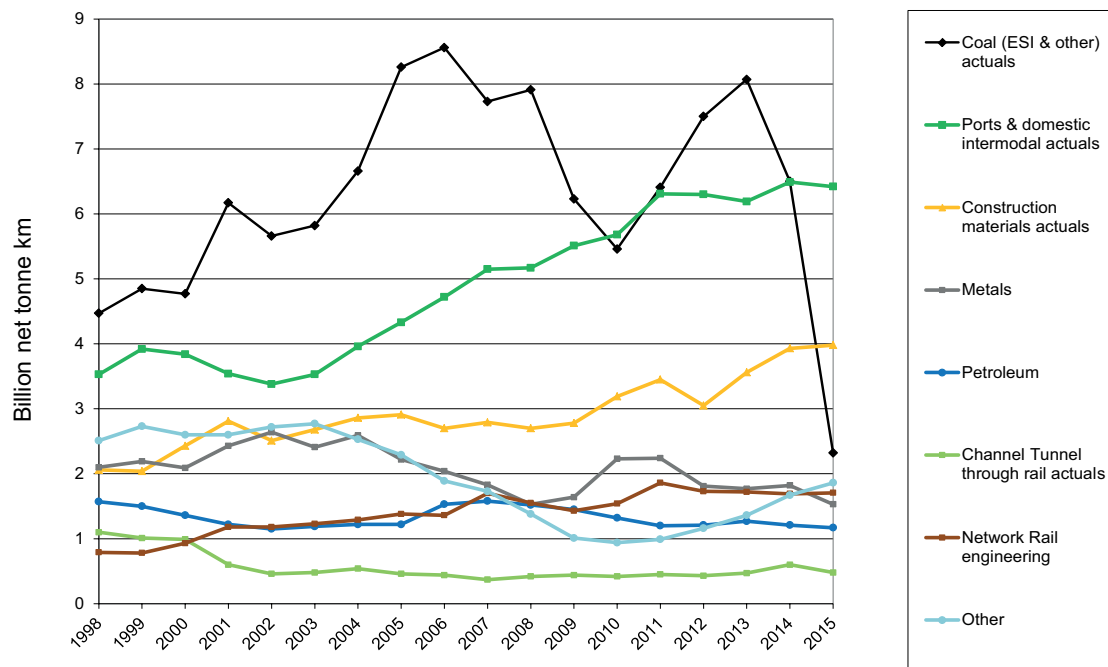

Figure 2.7: GB Freight commodity volumes 1998-15

- **Express freight and urban logistics**: with proven 90 to 110 mph operational capability, rail freight operators are exploring new business opportunities in the time-critical express freight sector and already

successfully trialling the role rail can play in a leading a low carbon urban logistics supply chain in the same day delivery era

- **Automotive**: with up to 40% modal share from certain rail connected production sites south of the border, rail is demonstrating to Original Equipment Manufacturers (OEMs) its credentials as a swift and secure means to shift high-value finished automotive volume from factory gate to sales location and for semi-finished parts such as chassis from manufacturing point to factory.

Demand for rail freight is forecast to grow at an average rate of 2.9% per annum up to 2043, as set out in the Freight Market Study. This was published in October 2013 as part of the Long Term Planning Process (LTPP), and set out unconstrained growth forecasts for each commodity, underpinned by a set of economic, policy and infrastructure capacity (network and terminal) assumptions. This analysis is clearly subject to significant uncertainty following the vote to leave the EU.

The economics of Scotland's railway

Demand side

The railway in Scotland is perhaps the most diverse in Great Britain in terms of the markets that it serves and the geography it operates in. A key difference between the railway in Scotland and the railway in England is that there are relatively few markets in Scotland where the railway can be considered to have a truly 'captive' market. This reflects the distribution of population and effectiveness of other transport networks in Scotland.

This means that in most markets, passenger demand is highly sensitive to fares and to conditions in other transport markets. Where a key objective of railway policy is to address road congestion (or improve environmental sustainability), potential policy levers geared at managing passenger demand into other time periods can have the inadvertent impact of managing passenger demand onto the road network if not applied carefully.

The implication for the Scottish Government is that policies that aim to maximise the socio-economic value of the railway will tend not to be the same policies as those that aim to maximise its revenues.

3 The economic contribution of forestry and other activities on Scotland's National Forest Estate; CJC Consulting Ltd, December 2015

Cost side

The principal costs of running the railway are operation, renewal and maintenance (OM&R) costs. Many of these costs are relatively insensitive to the amount of traffic that is carried, so as traffic volumes increase the cost-per-train tends to decrease. Likewise, operating costs per train tend to decline sharply the more densely operated a network is. This is because rolling stock can be more efficiently managed and maintained where a network is intensively utilised. However, the extent to which the railway benefits from these economies of scale is limited once performance costs are considered, especially on the kind of mixed traffic network that we have in Scotland.

Implications for Scotland

Capacity enhancements have tended to be developed to meet anticipated passenger demand that may only exist for a small number of hours per day, especially for urban commuting where demand has historically been highly peaked.

In economic terms the benefits of capacity enhancements tend to be relatively small in the context of the overall investment costs. Improvements to the railway in Scotland tend therefore to require ongoing revenue support (in addition to the capital funding that is provided).

If the Scottish Government is to maximise the economic value of the railway, it should carefully consider trade-offs in the context of these economic fundamentals. The industry will work closely to ensure that choices are made on the best available evidence.

Industry finances in Scotland

The themes outlined are supported by the data on industry subsidy in Scotland. Analysis carried out by the ORR on 2014/15[4] data suggests that 56% of the total cost of running the railway in Scotland is provided by Government, mostly (but not entirely) by the Scottish Government. This compares with a figure of 25.6% for the GB railway as a whole.

Government paid the industry £675m in subsidy in 2014/15, equivalent to £6.70 per journey on the passenger network. This compares to a figure of £2.13 subsidy per journey for the Great Britain network as a whole.

Passenger income

As discussed, the main driver for this level of subsidy requirement is the different economics of Scotland's railway. ScotRail's yields per journey and per-passenger-km are lower than achieved on other parts of the GB network. The subsidy requirement in England and Wales has reduced markedly in recent years because the UK Government has pursued a policy of above-inflation regulated fares increases which the market – up to now – has been able to bear overall.

The Scottish Government has not followed this policy as it would not be consistent with its economic and social policies. Its scope for doing so is limited because relatively few markets in Scotland are captive to rail. Passenger income per journey is 16% lower than the GB average, and passenger income per passenger km is 29% lower reflecting longer distances per journey in Scotland.

Industry costs

The extensive nature of the network in Scotland and the fact that the only dense urban commuter network is that around Glasgow, means that on a track km basis, Network Rail costs in Scotland are significantly lower than the GB network, as Figure 2.8 illustrates.
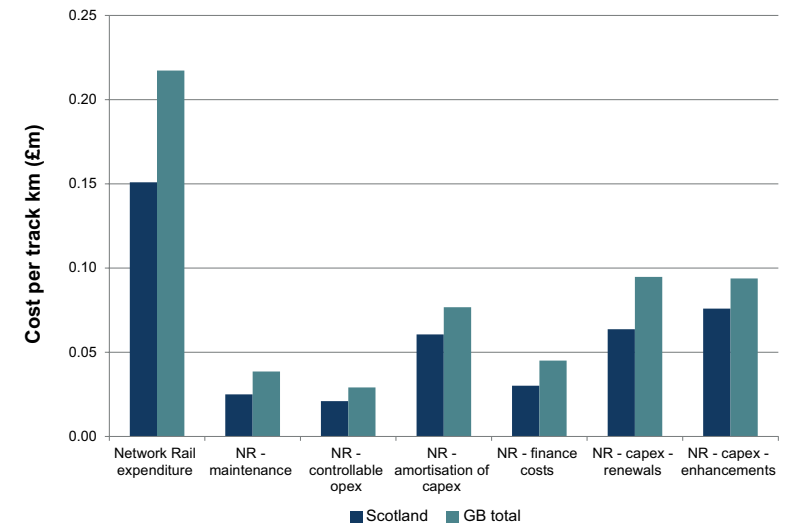

Figure 2.8 : Comparison of Network Rail Costs in Scotland and GB wide

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4   http://orr.gov.uk/statistics/published-stats/gb-rail-industry-financial-information/gb-rail-industry-financial-information-2014-15

Background and Industry Context

However, once costs are adjusted to take account of this, cost per passenger-km are 27% higher than they are for GB as a whole. This reflects longer trip distances (an average of 44.7km in Scotland versus 37.7km in Great Britain as a whole) and lower average loadings per train (an average of 81 passengers per train in Scotland versus 121 passengers per train across GB as a whole).

Implications for government choices

A high proportion of the population of Scotland live in the Central Belt, while the rail network covers a much wider geographical area, and some of the regions served by the railway in Scotland have very low population densities. Assuming the network is maintained in its current form, the scope for reducing subsidy significantly in the short-to-medium terms is therefore likely to be limited.

The industry is committed to reducing costs where opportunities to do so efficiently arise. Any adverse impacts to the Scottish economy associated with Brexit are likely to affect rail revenue, and therefore the subsidy requirement of the network in Scotland. The challenge for the industry and for the Scottish Government will be to ensure that this ongoing subsidy requirement is factored into decisions and choices around future specifications and investments.

Key policy challenges

The devolution process

Devolution of powers from the UK Government to the Scottish Parliament has enabled the industry and the Scottish Government to work as close partners, understanding new challenges and identifying future choices that will meet them since rail powers were devolved to the Scottish Government.

Transport Planning Framework

The Scottish Government has consistently sought - through successive National Planning Frameworks, the National Transport Strategy and the Strategic Transport Projects Review (STPR) - to improve the evidence base on which transport policies are formulated and transport investment is planned.

Transport is an integral part of the Scottish Government's overall economic and land use strategy, and in setting out a coherent approach to addressing whole-transport system problems the Scottish Government has developed a sound foundation on which future investments can be delivered.

Rail as an instrument of wider government policies

The Scottish Government has recognised that transport, including rail, needs to be fully integrated with other strategies supporting economic development, sustainable communities and improving access. Major projects, including the Borders Railway and the re-opening of the route between Airdrie and Bathgate, have been developed to act as catalysts and enablers to achieving balanced, geographically-diverse economic development.

This open-minded, measured approach has been both popular and largely successful as passenger numbers have generally significantly exceeded expectations. Where evaluations have been carried out, they have concluded that rail projects have supported and delivered against broader government objectives.

03

The railway in 2019 and its challenges

To provide a context in this advice for the choices the Scottish Government and funders will need to make, it is assumed that the timetable proposed for March 2019 is delivered as planned.

Service improvements will be supported by the delivery of major projects, including:

- Delivery of the Edinburgh Glasgow Improvements Project (EGIP)

- Improvements to the Highland Main Line

- Further electrification in the Central Belt, including routes to Stirling, Dunblane and Alloa, and the Shotts line, supporting enhanced passenger services across Scotland as part of the 'Revolution in Rail'

- Introduction of High Speed Trains to link Scotland's seven cities and a recast timetable to improve journey times and optimise capacity

- New and faster trains on cross-border passenger services

- Improvements to freight capability to support the Scottish Government's freight strategy.

The cost of providing these enhancements, through both the ScotRail franchise and through Network Rail's enhancements programme, will amount to over £1.875[1] billion of investment by the Scottish Government once they have been delivered in March 2019.

Clear progress will have been made on both the strategy and the activities required to support the introduction and development of services that will operate to and from Scotland using High Speed 2.

Continuing this programme of improvements, and embedding the improved planning and programme development processes demanded by the Hendy and Bowe reviews, will support the achievement of the Scottish Government's aspirations for Scotland. These will be underpinned by identifying opportunities for continuing technological and operational innovation and where there is the potential to promote wider benefits around sustainability, skills development and accessibility.

Revolution for Rail

In March 2016 the Transport Minister announced details of the new timetable that will run from June 2018 as part of a 'Revolution for Rail". This timetable will provide:

- More than 200 new services per day supported by additional rolling stock. These services will deliver a transformation in rail connectivity and capacity between Aberdeen, Inverness, Dundee and Perth and their local communities

- Faster limited-stop services between Edinburgh/Glasgow and both Aberdeen and Inverness using refurbished High Speed Trains. These will take advantage of enhanced infrastructure to deliver lower average journey times than today

- Faster, more reliable electric services from Stirling to Edinburgh and Glasgow as a result of the ongoing electrification of the Scottish network

- Increased seating capacity on Fife and Borders routes.

A key point to note is that the investment in "Revolution for Rail" is not simply the provision of additional infrastructure and rolling stock. It combines these investments with timetable changes and rolling stock deployment to maximise the benefit of the additional funding that is being provided by the Scottish Government.

The ScotRail Alliance

Network Rail and ScotRail are working even more collaboratively and in an increasingly integrated manner under the ScotRail Alliance, following the commencement of the new franchise in 2015.

A single management team oversees day-to-day delivery of ScotRail services in Scotland, and fully integrated teams have been formed to manage:

- Operational control

- Performance

- Stations maintenance and enhancement projects.

The benefits of an Alliance approach will take time to deliver, as many of the obstacles it is designed to address are cultural, rather than technical. However, a key advantage of the Alliance so far has been to enable the railway in Scotland to speak with a more unified voice to the public, to customers and to external stakeholders.

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1 £1.4 billion Network Rail CP5 determination, £475 ScotRail rolling stock investment

The railway in 2019 and its challenges

Capacity challenges beyond 2019

The Scotland Route Study identified capacity challenges for the network in Scotland after 2019. Some of these challenges will be addressed through the "Revolution for Rail" improvements, but others will require further investment if they are to be addressed.

The forecasts developed for the Scotland Market Study indicate that by 2024 demand will outstrip available seating capacity on some parts of the network. For example, services terminating at Glasgow Central High Level station from both East Kilbride and the north Ayrshire coast will be at – or approaching full seating capacity.

Figure 3.1 : Anticipated capacity challenges Ayrshire & Inverclyde lines by 2024

Figure 3.2 : Anticipated capacity challenges on the East Kilbride line 2024

Delivering the outcomes funders want

A major theme in the RDG's 2016 Investing in the Future document, published in September 2016, is the need for Government to provide clarity on both the outcomes that it is seeking to achieve and on its overall strategy for achieving them.

The Scottish Government has defined what it expects the ScotRail franchise to deliver. The HLOS is an opportunity for it to restate – and where necessary align – these objectives for Network Rail in a form that considers the contribution that the wider railway (including freight) needs to make to meet its broader economic and social objectives. The industry is addressing how it can evolve to support delivery of efficient and transparent outcomes.

Focus on delivering outcomes

Transport is a means to an end rather than an end in itself. The outcomes the Scottish Government wants to achieve are therefore not transport outcomes, but are outcomes facilitated by transport.

Ensuring that the Scottish Government's policies in relation to the railway (i.e. the outputs it requires from the railway for the funds that it makes available) are consistent with its policies in other areas (for instance, in terms of education, skills, land use, industrial policy, rural development) is therefore critically important.

Where the linkage between outputs and outcomes is unclear, there is a risk of delivering sub-optimal solutions that fail to provide the benefits anticipated at the outset.

One way of achieving this is by ensuring that funder priorities are well reflected in appraisal guidance to investors (e.g. local authorities, commercial investors and operators). The guidance needs to ensure that proposals to enhance the network are the best proposals, both at a transport market-level and at a whole-economy level, and that they take account of all relevant costs and benefits.

The Department for Transport has recently consulted on its proposed guidance for estimating the wider economic impacts of transport projects. The Scottish Government is currently reviewing proposals to update its guidance on wider impacts into its Scottish Transport Appraisal Guidance (STAG). The industry supports the work that the Scottish Government is undertaking to ensure that STAG reflects and includes the growing evidence base on estimating the wider economic impacts of transport. It would welcome an

opportunity to work with government to identify and develop good practice in this area.

Applied proportionately, the improved guidance in this area should improve the evidence base on which future service and network enhancement decisions are taken, and on which future investment trade-offs are made.

System Operation

The railway is a system and must be planned, operated, maintained and enhanced as such. Railway operation is undertaken by multiple sub-businesses: Network Rail Routes, operating franchises and also fully private entities each focused on their local situation and business model. The boundaries of these businesses are not perfectly aligned, many operators traverse boundaries so "cross border" points are critical.

In addition to Transport Scotland, the principal funder and specifier, other funders are involved now and may become increasingly important. In this context a long-term, strategic view that takes into account and integrates train services, infrastructure, rolling stock and wider strategies is an important role that the System Operetor will provide

The railway's System Operator function delivers the long-term planning of the network, including developing proposals for future investment and acting as an internal client. It is also responsible for developing and delivering the GB timetable and taking decisions on allocating access rights to the network.

These essential functions shape the GB-wide network and deliver improvements to the benefit of Scottish passengers, freight shippers and wider stakeholders. They bind the network together, making the total greater than the sum of its individual parts.

The rail network has to support a mixture of long-distance, regional and urban passenger traffic as well as freight, all seeking (often constrained) network capacity. There are trade-offs needed in optimising the rail network, require a strong System Operator to make and implement the right choices.

Although the obligation of "no undue discrimination" between funders and between operators will continue to apply to all parts of Network Rail, the System Operator will be specifically responsible for ensuring the application of this principle in future.

The System Operator function is separate from the responsibilities of government to support the operation of an effective network that meets passenger and freight needs whilst delivering strategic outcomes. Equally

important is the provision of specialist advice to funders, stakeholders and to the industry which will only be credible where it is demonstrably independent.

Environment

Consultation on Scotland's Rail Infrastructure Strategy

Question 6

'6. Do you agree with our approach to emissions reductions and climate change adaptation? What else should be considered?'

The industry supports the approach set out in the Rail Infrastructure Strategy. As with safety, the environmental impact of rail needs to be considered in the wider transport context. Even with increased market penetration of electric cars, rail is well-placed to meet the Scottish Government's environmental objectives where there is a sustainable market and where the volume of traffic (passenger and freight) permits efficient use of energy.

The Scottish Government and the industry need to work together to ensure that the railway has sufficient capacity to accept additional traffic. This may require investment from the Scottish Government in some areas, but in other areas different policy responses – for example, managing demand onto off-peak services – could enable the cost of infrastructure enhancements to be deferred.

The industry also understands and is responding to the need for the railway to adapt to climate change. In practical terms, the increasing frequency of extreme weather affects passengers and freight shippers through service disruptions and consequential impact to journeys. The industry would therefore want to work with government to develop an approach that prioritises the identification and mitigation of climate-related risks on the network, in parallel with the industry's general drive to manage and improve the delivery of operational performance.

One of the choices for funders, the electrification and enhancement of the Edinburgh Suburban Line, demonstrates the whole-industry approach. It will make the whole network more robust by improving its diversionary capability and resilience, rather than its entire capacity being utilised to provide specific service enhancements. The Scotland Route Study identified other potential schemes of this type that can impact on network resilience, and specific funding may be required if the network is to respond positively to the challenges posed by climate change.

Emissions Policy

One of the main focuses of the Scottish Government's recent consultation was how the railway can contribute to the Scottish Government's targets for reducing CO$_2$ emissions. The Scottish Government has set a target to reduce these emissions by at least 42% by 2020, and 80% by 2050.

Rail is considered to be a sustainable mode because the emissions it produces vary only slightly with the number of people (or amount of freight) that is carried. Where services are well used, emissions per head are likely to be lower.

The most environmentally sustainable policy minimises travel. As people increasingly choose and are able to work from home (at least on a part-time basis), this option is becoming more realistic for governments. It will be best supported if fares structures can be revised to better meet the needs of this type of passenger. However, for many people in many occupations, working from home is not an option and not making leisure trips to see friends and relatives would reduce their quality of life.

Incentivising passengers to travel at different times of day or to use other transport networks, by either adjusting fares or by taking a more accommodating view to standing on trains, is likely to be difficult given the constraints of the current ScotRail franchise. However, demand management should be considered as part of the Scottish Government's future policy mix.

Where demand cannot be managed to match it to the available capacity, the industry needs to continue to ensure that the capacity provided reflects demand to ensure that the amount of redundant on-train capacity provided is minimised.

Reducing the number of fixed-formation trains that operate throughout the day should be considered. For example, on the Airdrie-Bathgate route between Helensburgh and Edinburgh, 6 car trains are operated all day along the entire route, even though this capacity may only be required on specific sections of the route and at certain times of the day.

The cost of maintaining fixed formation train on this route in terms of CO$_2$ is over 4.5K tonnes per annum, while matching capacity with demand in off-peak could save between 1.5m to 2m vehicle miles per year. Maintaining this practice creates both financial and environmental costs that are potentially avoidable. Analysis carried out by the industry suggests that the financial cost of operating this policy could amount to more than £2 million per annum for this route alone.

Ultimately, the Scottish Government may need to trade-off its environmental objectives for rail against its social and economic objectives. For example, on many routes in Scotland there are only relatively minor differences between peak and off-peak service provision.

Striking a balance between the government's social and economic objectives and its environmental objectives may be difficult. However, the debate needs to be informed by good analysis. The measurements that the Scottish Government use to assess environmental sustainability should consider environmental performance across the network, reflecting CO_2 emissions on a per passenger km basis rather than on a train km basis.

Climate Change Adaption

In terms of climate change adaptation, the Scottish network is coming under more pressure from extreme weather events that most of the infrastructure was not designed to withstand. Changing weather patterns are already creating significant challenges for the industry. Across Great Britain, there are an average of 1.6 million weather related delay minutes a year, and the winter of 2015/16 demonstrated the need to focus on the resilience of Scotland's network both in the short-term but also in the long-term to allow passengers and freight users to continue to rely on the network.

Responding to these challenges will be expensive, with very little improvements in services being directly visible to passengers or freight shippers. As discussed elsewhere, 70% of delay minutes on the network in Scotland in 2016 were attributable to reactionary rather than primary delays, so the impact of these extreme weather events is likely to have been exacerbated by the increase in traffic using the network in recent years.

Adapting the network to address the challenge of a changing climate (and therefore preserving existing connectivity) will therefore inevitably reduce the level of resource that is available to improve overall transport-related emissions elsewhere on the network.

Providing clarity and understanding constraints

This section sets out the basic principles on which the industry believes a successful set of outcomes after 2019 can be constructed. The key principles outlined below are based on a shared understanding of:

- The respective roles and objectives of government and industry

- The scope and the limitations of government and of the industry in relation to specific policy areas.

Establishing clearly defined roles

Having clarity about which roles are allocated to which industry body will help to ensure that the railway operates on a sustainable basis.
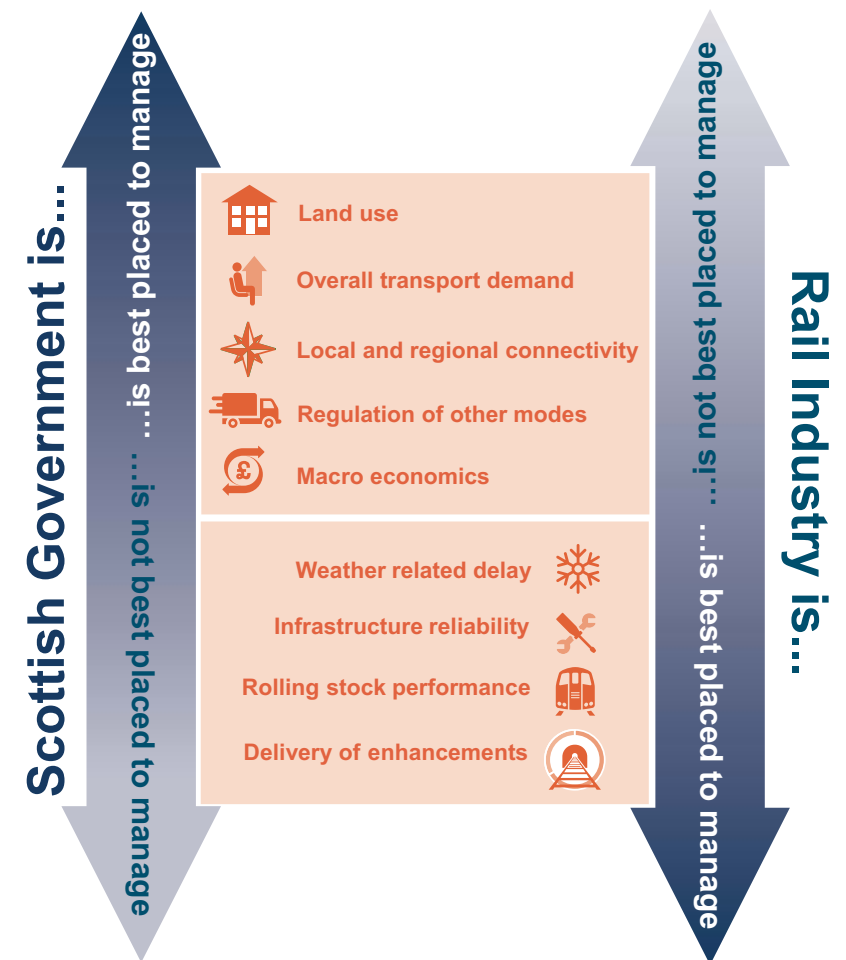

Scottish Government is... ....is best placed to manage ...is not best placed to manage

Rail Industry is... ...is not best placed to manage ...is best placed to manage

- Land use
- Overall transport demand
- Local and regional connectivity
- Regulation of other modes
- Macro economics

- Weather related delay
- Infrastructure reliability
- Rolling stock performance
- Delivery of enhancements

Figure 3.3 : Examples of risk allocation between Funder, Network Rail and train operators

The railway in 2019 and its challenges

The industry believes that the Scottish Government should define a set of appropriate outputs which are challenging but achievable. They should be mapped as far as is possible to clearly defined outcomes so that users and stakeholders are clear on what outputs are likely to be delivered and what outcomes are being supported.

The industry recognises that as government will be central to choices around outputs and investment, its advice to the Scottish Government is that government should prioritise specifying outcomes in the HLOS. Within a pipeline approach to investment and co-ordination across the industry, this will allow informed decisions to be taken that will optimise delivery and maximise value-for-money.

Setting clear objectives

Ensuring that the railway in Scotland can meet the Scottish Government's objectives while remaining financially sustainable will require commitment from both industry and government. Communication of government policies and strategies needs to be supported by clear engagement to identify risks and opportunities on the part of industry.

The HLOS and its supporting documents are an opportunity for the Scottish Government to go further than it has previously been able to do, and to map its output specification to outcomes identified within its high-level strategies, most notably its Economic Strategy.

In setting out options, the industry considers that there are a number of fundamental principles that need to be taken into account. These include:

- Prioritising customer experience

- Improving stations, retailing and the customer interface with the railway network

- Supporting the delivery of the Scottish Government's rail freight strategy

- Delivering stable and consistent operational performance

- Delivering a safe railway and reducing risks

- Ensuring that the network is sustainable and resilient, and that it is available for use at the optimum level.

These are areas where trade-offs and prioritisation will be required in the context of the level of funding that government provides.

Agreeing how the railway can best serve the Scottish economy

Most of Scotland's trade in goods and services is carried out with the other constituent nations of the UK, and with trading partners on mainland Europe. The urban core of Scotland is located over 100 miles from the nearest significant metropolitan neighbour and the most densely populated parts of England are more than 200 miles to the south of the Central Belt.

The improved cross-border connectivity that HS2 will provide represents a major opportunity to improve both absolute journey times and rail's share of the Anglo Scottish travel market. It is also likely to free up network capacity for rail freight on the key main lines south of Manchester and Leeds which can benefit Scotland.

Minimising the impact that physical geography has on the Scottish economy is a key objective of the Scottish Government, and is reflected in its broader transport policies. These have recently included enhancements to Scotland's motorway and trunk road networks, reductions in Air Passenger Duty and the introduction of Road Equivalent Tariffs on several ferry routes.

Cross-border passenger and freight services need to be integrated with internal Scottish services, recognising that the rail network has to support a mixture of long-distance, regional and urban passenger traffic as well as freight. There are trade-offs needed in optimising the rail network, and these need to take account of existing and planned enhancements to the road network in Scotland, in particular the impact they are likely to have on the subsidy required to support interurban rail services.

The connectivity provided by the rail network is clearly central to delivering the broader outcomes and objectives that the government is pursuing. As discussed in Chapter 2, while rail is particularly effective where a relatively high volume of passengers travel, funders need to take account of the ongoing subsidy requirements when specifying future services.

An integrated approach to planning train service enhancements, with the rail industry working in partnership with the Scottish Government, local authorities and other key stakeholders, is therefore central to ensuring that government outcomes and objectives are delivered.

Wider issues around providing local connectivity

The Scottish Government is responsible for setting the direction of how land is used and managed. Decisions on land use – whether they affect housing developments or employment - can help a region to adapt to new economic

realities, as well as providing opportunities that radically improve people's quality of life.

Transport is key in making land use plans work, and providing access to the rail network may be critical in unlocking the benefits from strategic land use decisions. However, rail is not the only mode of public transport, and may not be appropriate in all circumstances. The challenge the Scottish Government and the industry faces is that, if demand on the network around key urban centres continues to grow in the longer term, consideration may eventually be required on which mode of transport is best placed to meet this demand.

In December 2016 the Scottish Government published a White Paper incorporating the findings of its Planning Review. The context of the White Paper is a relatively unresponsive housing market (in terms of new housing developments) when set against projected demand. The White Paper identified infrastructure provision as a particular obstacle to implementing housing development plans. In particular, it identifies the current 'Section 75' agreements between developers and local authorities as being an ineffective way of recouping infrastructure costs from developers.

The report recommends that alternative infrastructure funding mechanisms be developed to improve the incentives of developers and infrastructure providers and that these structures should be developed at a local or regional level. However, the planning and delivery of railway infrastructure rarely fits neatly into either a local or a regional-area scale, as new stations track or rail junction improvements carried out in one location will have impact on the network as a whole.

Therefore, the benefits and dis-benefits of providing new railway infrastructure need to be looked at on a corridor or network basis and not just in relation to a specific local or regional need.

The industry will continue to work with stakeholders (including the Scottish Government) to ensure that the railway continues to play an effective role in providing access to employment, labour and freight markets. It will work with funders and developers to ensure that where new stations and services are proposed, they provide value-for-money and can be delivered while maintaining network performance and the outputs of the entire network.

Issues with the provision of interchange with other modes

Passengers use rail as part of a journey that may include walking, cycling, taking the bus or driving. Ensuring that interchanges between transport modes – whether public or private – are as convenient as possible will support the financial and economic cases for rail and for public transport as a whole.

Figure 3.4 : Example of analysis of population living within 1km, 2km and 3km of Scottish stations

Analysis carried out by Network Rail suggests that 31% of the Scottish population lives within one kilometre of a rail station, rising to 56% within two kilometres. However, almost 80% of people live within five kilometres of a station, so policies aimed at improving interchange can significantly increase the reach of the railway and the benefits it can support

Interchange between rail and other modes is necessarily a shared responsibility between the industry, its funders and of other infrastructure and service providers. An integrated approach is therefore required that takes account of both the relevant costs and benefits and of the strategic fit of intervening in specific modes at specific locations.

For instance, the user benefits of providing Park and Ride facilities at selected stations is clear; what is not always clear is whether the location of Park and Ride is optimal in the context of either rail or the road network.

The regulatory environment in which the bus market exists is not necessarily consistent with a long-term drive towards integration of different transport modes. The benefits of smart ticketing will be limited if people are unable to use them across a range of public transport options.

The railway in 2019 and its challenges

Finding an appropriate balance in this area will be challenging. However, it is only the Scottish Government that can ultimately make these choices and implement the policies required to deliver strong outcomes in this area.

Wider opportunities arising as a result of enhancing customer experiences

The railway will only be successful in the longer term if it views the world through the eyes of its customers and of its potential customers, anticipating and responding to their needs. This means considering the service that it offers in its entirety, including:

- How services are timetabled

- What future ticketing requirements are likely to be

- What environments will be required at stations and on trains

- How the industry can best support onward travel (see above)

- How the industry reacts during network disruption.

Understanding passenger priorities

Scotland's railway is principally used by passengers, both for internal travel and cross-border journeys. Understanding, anticipating and meeting passenger priorities is therefore crucial to maximising the benefits that can be derived from the railway, a key challenge recognised in the RDG's 'Customer Journey' project.

A prerequisite for expanding passenger rail markets in Scotland is to offer passengers a consistently high quality product, and the rail industry needs to be commercially incentivised to focus on this objective. The current ScotRail franchise agreement has targets of achieving 90% customer satisfaction from 2019 onwards are embedded within it.

However, commercial imperatives on their own may not be sufficient: passengers need to be sure that the whole industry is focused on delivering services that are consistent with their expectations and needs. Where obstacles exist that are likely to prevent these being met, the industry as a whole needs to work with passengers, funders and stakeholders to ensure that they are addressed in an appropriate way, including through franchise and regulatory targets. The RDG are helping to inform the government, using the 'Customer Journey' project, to ensure future franchising delivers the right outcome for both the customer and the industry.

Until recently, overall passenger satisfaction in Scotland had steadily improved over the last fifteen years. ScotRail achieved an overall score of approximately 90% in 2015, and cross-border operators also performed strongly. It is striking that although overall passenger satisfaction has been high, passenger's perception of whether the railway delivers value-for-money is far less positive for both ScotRail and for long-distance operators serving Scotland. The previously high levels of satisfaction on ScotRail services have been eroded by the well document performance problems in 2016.

Recent performance of ScotRail services has been below target, and is likely to remain a key concern for passengers after the overall value-for-money and the ability to get a seat. Ultimately, the challenge for the Scottish Government and for the industry will be to continue to understand the drivers of passenger perceptions of value-for-money and to respond accordingly.

This will require a continuation of the ongoing informed discussion between customers, the wider stakeholder community, government and the industry itself around the nature of the outputs that passengers require and how they should be prioritised. Inevitably, trade-offs will need to be made, but having these discussions now will ensure that these are made on an informed basis.

Title	Scotland Rank	Scotland Index
Price of train tickets offers better value-for-money	1	463
Passengers always able to get a seat on the train	2	404
Trains sufficiently frequent at the times I wish to travel	3	235
Train company keeps passengers informed about delays	4	156
More trains arrive on time than happens now	5	146
Less frequent major unplanned disruptions to your journey	6	131
Accurate and timely information available at stations	7	130
Free Wi-Fi available on the train	8	126
Fewer trains cancelled than happens now	9	113
Well-maintained, clean toilet facilities on every train	10	109

Table 3.1 - Passenger Focus: Rail passengers' priorities for Improvement (October 2014)[1]

1   The Scotland Index reflects the satisfaction score for a particular service attribute compared to the average satisfaction score across all service attributes. The index score allows us to see how much more important, or less important, one service attribute is compared with an average score of 100

Delivering for passengers

Through the 'Customer Journey' project being led by the RDG, the industry has developed a more informed understanding of the needs and expectations of its customers. There are initiatives already in progress – including through the ScotRail franchise contract – that are designed to meet these needs and to address key problem areas.
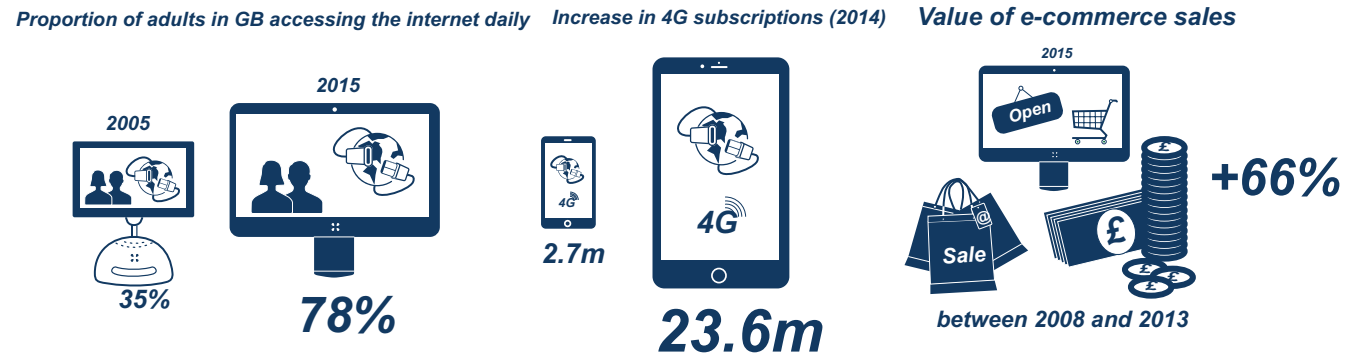
Customers have told us they want smart, easy to use tickets that reflect a retail experience offered outside rail. To meet this expectation the industry will move from physical tickets to ones that are stored in the cloud. This will give customers more control over the way they travel. Physical tickets will still be available, but these will be based on barcode technology.

The provision of information has improved in recent years so customers now get more consistent and accurate information across all channels but the industry has some way to go to make that information richer and more timely. By the end of 2018 the industry will have introduced a better, easier and more responsive passenger assistance service enabling all customers to benefit from rail travel.

A key strategic advantage of rail over other modes is the ability to use travel time productively, particularly for people who are digitally enabled.

The high levels of penetration of 3G and 4G devices (see Figure 3.5) in markets serving younger age groups, combined with the value that passengers put on their availability (the industry estimates that a minute spent with a good Wi-Fi connection is the equivalent of an 8 minute journey time saving for a business user[2]), indicates the importance of providing network connectivity to passengers and supports the provision of on-board Wi-Fi that has been delivered through the ScotRail franchise.

Proportion of adults in GB accessing the internet daily

2005
35%

2015
78%

Increase in 4G subscriptions (2014)

2.7m

4G

23.6m

Value of e-commerce sales

2015
Open
Sale

+66%

between 2008 and 2013

Smartphone penetration 2015

90%
16-24
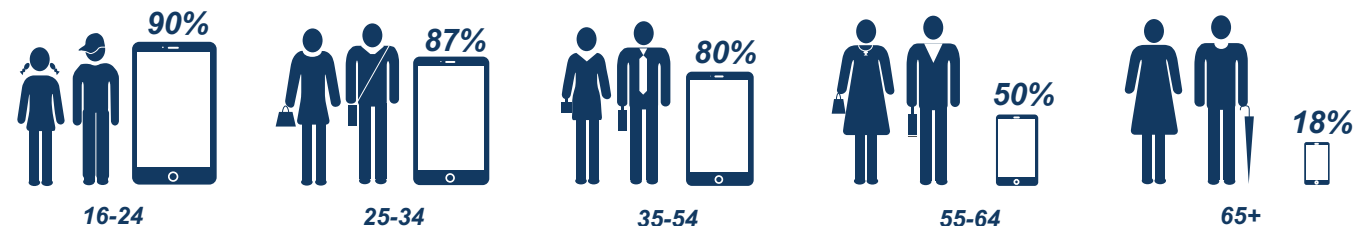
87%
25-34

80%
35-54

50%
55-64

18%
65+

Figure 3.5 : Examples of the increase in digital adoption in Britain

2   Passenger Demand Forecasting Handbook v5.1

The railway in 2019 and its challenges

The challenge of supporting rural economies

Much of the Scottish railway network provides links within and between urban areas. However, the railway in Scotland also plays an important role supporting rural areas, providing both lifeline services for local populations as well as acting as a gateway for visitors. The challenge the railway faces in rural areas is to ensure that it delivers public transport relevant to the markets it serves, recognising that the railway is often uncompetitive with roads in terms of journey times and with buses in terms of service frequency.

Rural services are crucial for sustaining local populations: health, education and other social services are essential for rural areas to function properly. They are important in providing a lifeline to the markets they serve: the number of passengers carried can be small, but the economic and social impact of not having them would be immense.

They are often challenging to manage. Many rural routes are single track, relatively minor incidents can quickly escalate if the causes are not identified and addressed promptly.

The industry will continue to work with the Scottish Government to identify potential opportunities for improving rural railways and to ensure that these improvements feed into the Scottish Government's broader objectives for rural economies. The ScotRail Alliance's support for Community Rail Partnerships is already demonstrating that working closely with local communities can support initiatives that increase demand, improve the travelling and station environments and embed and share best practice across the network.

Improving environmental sustainability

Environmental sustainability and emissions reduction is a key priority for the Scottish Government. The approach set out in the Rail Infrastructure Strategy Consultation is an approach the rail industry is supportive of, and improving environmental sustainability – at least in terms of emissions - is consistent with an economic and financially sustainable railway.

If the government is to achieve its objectives on environmental sustainability, the railway will need to focus on serving the markets where it can be competitive. In some cases, this will be challenging, as services are often specified to meet broader social objectives (e.g. early morning and late evening services) rather than to compete with road.

Where investments are planned that improve both rail and road access to the same market, funders need to be aware that the positive environmental impacts of providing additional rail connectivity are likely to be far less than they would have been if the rail investment had taken place on its own (albeit recognising that there may be broader benefits of improving rail and road networks simultaneously).

The most effective contribution the rail industry can make to meet the government's environmental objectives is to make best use of the capacity that already exists. The industry will therefore continue to identify opportunities - including through ScotRail's smart ticketing programme and by running longer freight trains - where managing demand better could ensure that enhancements to the network capacity are timed efficiently. This approach will help to improve the carbon footprint of the network whilst also contributing to its financial sustainability.

In terms of freight sustainability, the industry proposes that the Scottish Government continue to focus investment on those parts of the network which will maximise the potential for modal shift to rail, building on the lessons learned through both the Rail Freight Strategy and the Freight Deep Dive study.

With significant support already provided from the government, train operator-owner groups and the wider industry, rail is already making progress in strengthening its sustainability. The industry is fully supportive of a step change in franchising policy and the latest ScotRail and Caledonian Sleeper franchises' have seen the adoption of key international standards on environment and energy management. The ScotRail franchise also includes a commitment to reduce carbon emissions from both traction and non-traction sources, send zero waste to landfill and focus on social impact through greater use of railway assets for community benefits.

Within Network Rail, Scotland Route has started to deliver its Weather Resilience and Climate Change Adaption (WRaCCA) Strategy and the principles will be further embedded in asset policies, contract requirements and their governance processes, supporting appropriate consideration in investment decisions.

There is still variation in how Network Rail and train operators collaborate on issues including noise, non-traction energy and asset renewals. The ScotRail Alliance is enabling a more collaborative approach that will support the industry with continuing to develop and implement climate adaption plans and work with stakeholders to promote biodiversity into the future.

Consultation on Scotland's Rail Infrastructure Strategy

Question 2

'How might we make trade-offs and prioritise between different types of investments, while ensuring that our actions are aligned with our vision?'

Note that this question refers to the types of trade-offs that may be required (e.g. where improvements to journey times may impact on levels of connectivity, or vice versa) rather than actual names/locations of schemes promoted or supported by stakeholders.

Trade-offs are inevitable when planning a complex system. It serves a number of markets, and in doing so provides benefits to passengers and freight shippers as well as delivering the wider transport objectives of the Scottish Government. Because of this diversity, the railway has to recognise that investment and service choices will need to be optimised if the benefits that can be realised through an integrated programme are to be maximised.

The industry understands that trade-offs have to be recognised and considered when specifying investment in services and infrastructure. The delivery of a priority on one part of the network may only be deliverable (in the absence of additional funding) by increasing risks elsewhere on the network.

A good example of this is the delivery of the Airdrie-Bathgate line, which significantly improved and integrated rail connectivity between Edinburgh and Glasgow, but operating an intensive end-to-end service increases the performance risk exposure of both the Glasgow and Edinburgh networks. The overall value and benefits delivered by the service is significantly positive, but the example illustrates the need for funders to assess the likely effects of investment on the current network and its users.

The key to making the appropriate trade-offs is to ensure that the transport objectives of investment projects are clearly set out and specified by the bodies that fund the railway in Scotland (including, but not exclusively, the Scottish Government).

Furthermore, decisions made by funders need to take account of all relevant costs and all relevant benefits. The industry's Passenger Demand Forecasting Handbook (PDFH) and Transport Scotland's STAG[3] tools are key to assessing and developing proposals. The industry wishes to build on its role, both as current provider of services and as system operator, to engage at an early stage to support the development of deliverable, affordable schemes and to work with the Scottish Government and wider stakeholders to maximise the opportunities for delivering outcomes that deliver the highest potential gain for Scotland.

Consultation on Scotland's Rail Infrastructure Strategy

Question 8

'How should performance be balanced against the wider priorities for reduced journey times and the full utilisation of existing and new capacity?'

As illustrated, performance – both punctuality and reliability – needs to be understood in the same context as timetabled journey times and service frequency; all are aspects of broader rail connectivity and, as discussed in question 2, improvements to one form of connectivity may require trade-offs. The industry estimates that a minute spent on a delayed service in Scotland is worth approximately three times more to passengers than a minute spent on a punctual service.

On a mixed-traffic railway where traffic (in terms of train kms) has approximately doubled over the last two decades, and where 70% of delays are a result of knock-on delays rather than the direct impact of the original incident, the industry considers that recognising the complex geographical nature of capacity utilisation and service recovery decisions should be considered as part of Scottish Ministers' specification of network outputs.

The industry wishes to support the Scottish Government in ensuring that it has clarity as to the priorities in terms of performance, capacity and journey times that it will take forward, and to identify potential choices that may involve some element of trade-off.

Enhancements to increase network capacity on a network where passenger demand is highly 'peaked' may have relatively weak business cases compared to alternative available policy options. These alternatives should be carefully considered and, where it is cost effective to do, tested in a delivery environment to determine whether they meet passenger and freight needs effectively.

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3   Scottish Transport Appraisal Guidance

Industry level trade-offs

The previous section illustrates the range and complexity of the trade-offs that the Scottish Government will need to consider when setting outcomes for the industry to work towards over the coming years. The industry is well placed to inform these trade-offs and to advise the Scottish Government of the implications of the choices that it is accountable for making.

However, the industry would also advise the Scottish Government to recognise the challenges it faces, and support it in the decisions and trade-offs that it should make.

Levers for managing trade-offs

The industry's vision for a modern, focused railway in Scotland is based around a number of key themes. These are:

- Customer focus – the industry has to put the current and future needs of its users at the centre of its development, recognising that delivering a reliable, safe and capable railway is the fundamental product, but that this product will be most attractive where it caters for increasing technological enablement for both passengers and freight shippers

- Partnership – the rail industry needs to be a reliable delivery partner to government and wider stakeholders, recognising the roles and expertise that is brought to strategic planning and supporting a wide range of government and stakeholders to meet their economic and social objectives

- Strategic – rail is a strategic mode of transport, and decisions taken now will have a long-term impact upon the future direction of the network. The rail industry is inherently long-term, and decisions need to be taken that reflect and support both current and future requirements of passenger and freight markets and of funders

- Network-wide – the future success of the rail industry is dependent on it playing its part as one element in the broader British (and European) network. Integrating the planning of the Scottish network with High Speed 2 (HS2), Northern Transport Strategy and the opportunities that these will create for improved passenger and freight services is at the centre of industry advice

- Flexible – existing models of funding for the railway are a product of an evolving regulatory and industry structure. Investment decisions need to be consistent with supporting wider outcomes that also need to be supported by robust engineering, economic evidence as well as an appropriate

funding mechanism. Business cases will need to reflect all the impacts of improving or altering rail outputs.

Focus on optimising service operation and performance

The key trade-off the industry needs to manage relates to the success the wider industry in Scotland has had in increasing demand whilst simultaneously improving performance and controlling industry costs.

As demand increases, one option for operators is to accommodate demand by increasing train capacity. Reviewing the balance between seating and standing accommodation is an option the Scottish Government could explore in the future. Notwithstanding this option, the industry seeks to manage capacity shortfalls by lengthening trains where the network infrastructure (e.g. platforms, track) permits, or by improving service frequencies where there is sufficient capacity to do so. Both these approaches require sufficient rolling stock to be available.

Even where additional rolling stock and staff are available to strengthen existing trains during the peak (which would enable ScotRail to minimise these additional costs), ScotRail's ability to lengthen trains is often constrained by the lack of capacity at terminating stations, where turnaround times are becoming increasingly limited.

Likewise, accommodating peak loadings by operating longer trains may only be achievable by increasing fleet utilisation beyond its optimum (and therefore adversely affecting train service performance). This is because it is likely to erode the availability of "hot spare" rolling stock if the overall fleet size is maintained. This risk needs to be balanced against the additional train leasing costs that the ScotRail franchise would incur if the fleet were to be enlarged.

Operating additional services during peak periods means that operators incur additional costs over and above those related to rolling stock, including staff costs, as well as increasing performance risk on the busiest parts of the network in Scotland. These costs inevitably feed through to the costs of operating the railway in Scotland, and these additional costs tend to outweigh the additional revenues they often generate.

Understanding and optimising network capability and capacity

Understanding what drives network capacity and capability, and the downstream impacts that specifying new and altered services can have on both service reliability and industry cost is important for the industry, funders and stakeholders.

The railway in 2019 and its challenges

Network capacity relates primarily to the throughput of trains on the network; whilst network capability relates to the physical characteristics of the network. Investing in network capability (e.g. by introducing electric traction, increasing loop lengths or improving the loading gauge on a route) can help address capacity problems through changing the operational characteristics of trains and infrastructure. Reducing signalling headways and junction margins or by reducing the speed differentials between different types of traffic) can similarly help to alleviate capacity problems.

Understanding the appropriate approach to managing the network requires a good knowledge of the timetable, of network constraints and of the potential options that exist. This supports informed decisions and recognises that addressing issues requires optimising service provision, rolling stock and infrastructure – assessed within a consistent and transparent framework.

As figure 3.6 illustrates, the scale of investment required to permit an additional train to operate can vary significantly depending on how close to maximum capacity the network is. For instance, a key limiting factor on
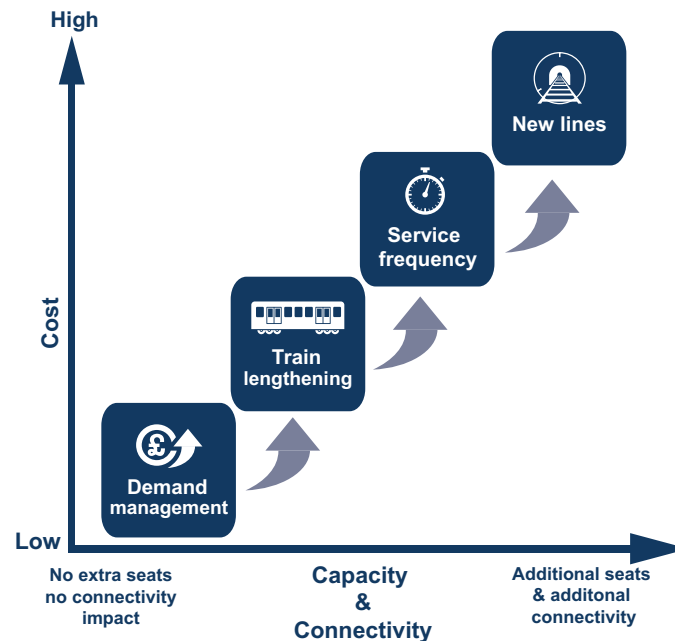
increasing service frequencies in the West of Scotland is the capacity at Glasgow Central and on its approaches.

Case Study: Supporting economic growth

Glasgow Central Station - Capacity Challenges

Glasgow Central is Scotland's busiest station. It is located at the hub of a number of busy commuter routes into Glasgow from the south and west of the city. In addition, the station is the destination for many Anglo Scottish services and will be Glasgow's access point for services running on HS2 when it opens in 2026.

The West of Scotland's economy is still adjusting to a long term decline in its manufacturing and primary industries, with a focus on developing a more city centre and service-oriented economy. Ensuring that the city is able to tap into (and support the development of) labour markets in Glasgow and surrounding areas is a key challenge for the Scottish Government and for local authorities as they seek to improve the productivity of the Scottish economy.

The Glasgow and Clyde Valley City Deal is one mechanism for addressing this productivity gap. Glasgow City and Renfrewshire Councils are exploring the possibility of improving connectivity to Glasgow Airport and East Renfrewshire Council are proposing a new station at Barrhead South on the Neilston line. Both projects have been proposed through the Glasgow and Clyde Valley City Deal. In addition, the 2043 Connectivity Conditional Outputs identified in the Scotland Market Study reflect the aspiration of the Scottish Government and local authorities to improve connectivity into Glasgow from the south and west of the country.

Accommodating additional and longer services into the station will be challenging, whilst delivering the high performing railway that passengers, customers and government rightly expect. The Scotland Route Study and the Investing in the Future document suggest that opportunities to improve the operation of the station could be explored in the short-term, including alterations to current timetables and investment in more capacity. Further development work to assess this complex task is in the process of being initiated by Network Rail with input from the rail industry. The immediate focus is to understand the extent of the capacity constraints around the existing platform lengths from December 2018 and beyond. It is recognised that major capacity interventions at the station are likely to be needed to accommodate longer term aspirations for more and longer trains and to improve the passenger experience.

Figure 3.6 : Hierarchies of rail capacity

The railway in 2019 and its challenges

There is an obvious trade-off between delivering incremental - but still disruptive - improvements at the station and delivering the larger schemes from the outset. As schemes become larger, more complex and more capital-intensive, funders will need to focus on the strategic outcomes that are being prioritised to ensure the delivery of good value-for-money.

This could include considering a fundamental review of local, regional and long-distance services served by the station, ensuring that these markets are served by the appropriate transport mode. This approach will ensure that the economy of the city and of the region is served in the best way possible.

Improving network reliability

The people of Scotland rely on their transport networks to access employment, do business and undertake leisure activities. Rail is a key element of this network, and reliability is a high priority for passengers and freight customers. It also complements other transport networks when they are disrupted, and it enables people to complete their journeys in exceptional circumstances such as the short-notice closure of the Forth Road Bridge in 2015.

Network reliability is a key requirement for rail, as the closure of the Lamington Viaduct on the West Coast Main Line (WCML) demonstrated in 2016. It highlighted the need for alternative routes to be available for cross-border and freight operators to run during these times of disruption. Developing the Scottish Strategic Freight Network is a key to allow freight to continue to run on rail and not be transferred to road or cancelled. When the rail network is not resilient, people and businesses suffer and the railway loses credibility as well as current and future business. An unreliable rail network also puts pressure on other transport systems, for example by increasing road congestion.

Developing plans to improve network reliability has to be aligned with plans to meet future demand. This includes ensuring that both capacity and capability are sufficient to enable trains to use diversionary routes when required. The rail industry is continuing to develop its Digital Railway programme, the Traffic Management component of which is due to move from development to its delivery phase in the future.

The trade-off that the Scottish Government needs to consider is that enhancing the railway to improve connectivity and network reliability in the short-and-medium terms often entails significant disruption to the network and therefore to the travelling public in the short-term. Where significant interventions are required to maintain, renew and enhance the railway, funders and the industry should consider the appropriate balance between longer blockades and frequent disruptive possessions that best reflect the needs of passengers, freight customers and funders.

Understanding how the railway supports the delivery of public policy

The industry understands that the Scottish Government provides the support that it does to the railway in Scotland because the railway is a vehicle for delivering its broader policy objectives.

The railway will be most successful in supporting public policy where it is able to respond to and anticipate market need. The industry has amassed a wealth of knowledge about what its markets are and how it can reach new markets. This knowledge is part of what the Scottish Government purchases from the industry through the regulatory settlement and through its franchise agreement with ScotRail and is a tool that is at the Scottish Government's disposal.

Using this knowledge base effectively will require the industry to work with funders to develop business cases that take account of the wider economic impacts of transport so that rail provision can be planned in a way that provides the best value-for-money.

It is important to recognise, however, that the railway's contribution as an economic and social policy tool is not always reflected in its own finances, as many of its benefits are external to the industry's balance sheet[4]. This has implications for funding which successive Scottish Governments have accepted, and it is important that this is acknowledged by government when formulating its future policies.

The challenge for the rail industry is to provide services that deliver funder requirements in an efficient, innovative and affordable way. The industry needs to be accountable for its decisions and the Scottish Government – in partnership with the Office of Rail and Road and the rail industry - will continue to monitor both the cost of the railway and the economic and societal benefits that it delivers and supports.

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4   As discussed in chapter 2 'Industry finances in Scotland'

The railway in 2019 and its challenges

Supporting freight movement

The Scottish Government's Strategy document "Delivering the Goods; Scotland's Rail Freight Strategy" required the Scotland Freight Joint Board to identify and formalise the Scottish Strategic Freight Network (SSFN). This work was completed at the end of 2016.

The objectives of the SSFN were developed collaboratively by all the key parties in the rail freight industry and are aligned with the objectives for the England & Wales SFN. Eight core principles or objectives for the ongoing development of the freight network were established. These objectives are:

- Longer and heavier trains
- Efficient operating characteristics
- 7-day and 24-hour capability
- W12 loading gauge
- New freight capacity
- Electrification of freight routes
- Strategic rail freight interchanges and terminals
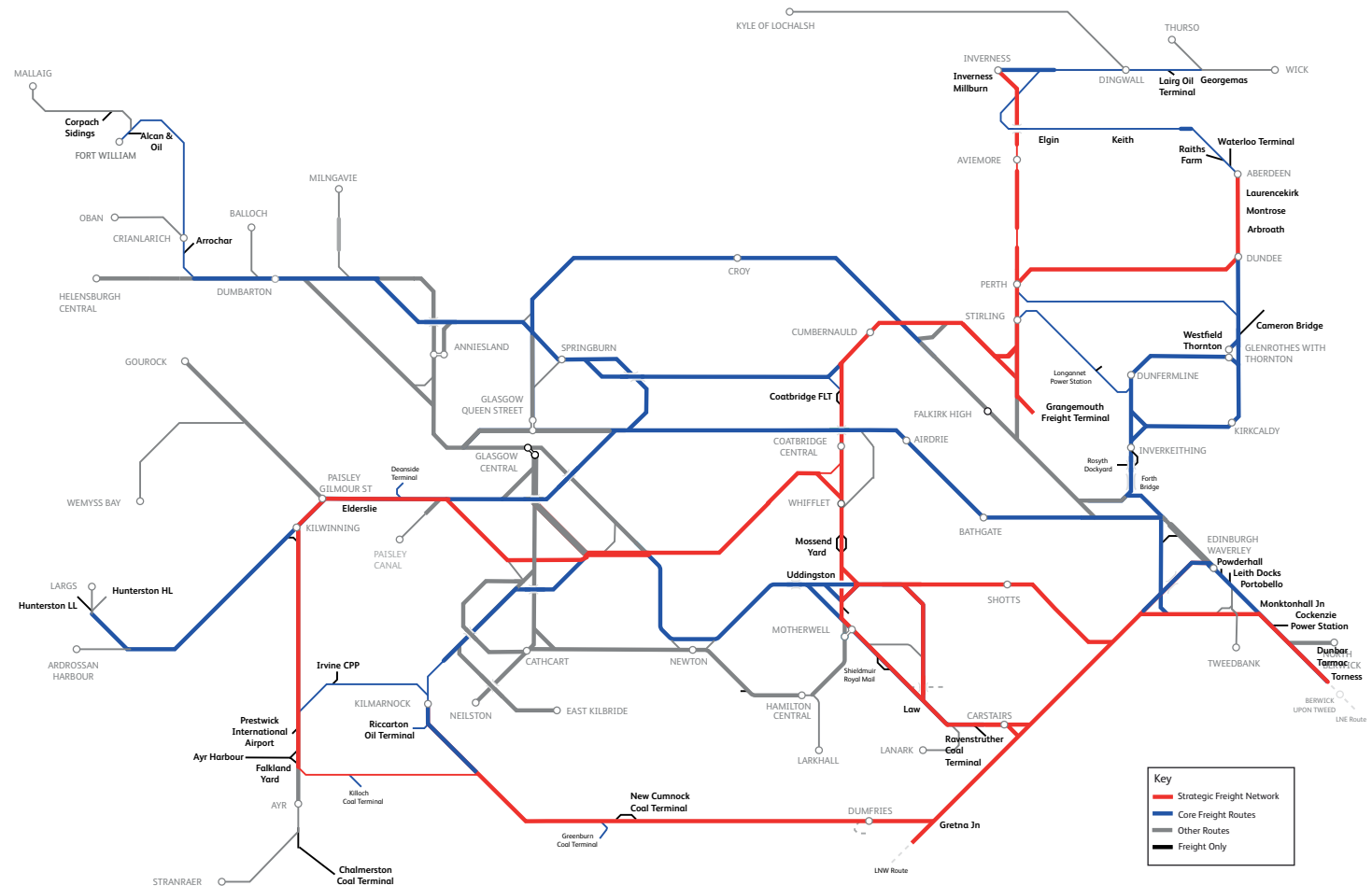- Strategic freight capacity initiative.

Figure 3.7 : The Scottish Strategic Freight Network (SSFN)

Understanding freight customer priorities

Although much smaller in scale than the passenger market, freight is integral to Scotland's rail network. The programme of enhancements that will be delivered by 2019 is focused on improving freight network capacity and capability enhancements. These include:

- Clearance of Carmuirs Aqueduct to W12 gauge (complete)

- 775m train capability and operational enhancements in the Mossend area

- RA10 on the Aberdeen Waterloo branch

- Capacity improvements between Holytown and Slateford (3-aspect signalling of the Shotts line)

- Electrification of the Grangemouth branch

- Inverness Yard capacity and capability enhancements

Whilst maintaining 775m long freight train capability is a requirement for Anglo Scottish routes (WCML/ECML), the industry in Scotland has agreed different lengths appropriate to the route.

Transport Scotland's recent "Delivering the Goods" Rail Freight Strategy and its accompanying "Deep Dive" document are the most recent surveys of customer priorities. The document highlighted a perception on the part of some rail freight customers that technical, regulatory and engineering challenges prevent the rail industry as a whole from proactively seeking new freight business.

The industry also needs to respond to the challenge of improving freight access to the network – both in terms of terminals and providing suitable train paths in a timely manner – whilst also ensuring that network performance is not compromised by maintaining unused freight train paths.

Targeted investment will be required on core routes as well as the agreed SSFN routes, particular projects have been identified as follows:-

- **Railhead and Terminal connectivity & capability**: in order that the rail network does not put terminals at a competitive disadvantage, there is a need to develop a plan for Scotland's intermodal terminals to consider their rail effectiveness

- **Improved freight paths**: a review to deliver optimal operational and timetabling outcomes for freight

- **Retention and increase of Route Availability**: to support potential growth markets and ensure that appropriate locomotives and wagons can be deployed.

In total, this comprehensive programme of network enhancements will deliver a freight network with universal utility, able to cater for changing traffic types and patterns.

Consultation on Scotland's Rail Infrastructure Strategy

Question 11

'11. Do you have any other views on how innovation could be better supported through the HLOS process and Network Rail's broader management of the rail infrastructure?'

Purposive, outcome-based regulation is considered to be the most effective way of incentivising Network Rail to deliver an efficient railway in Scotland. The industry view is that a strong and coherent business case would need to be developed. This would support the introduction of additional complexity and potentially constraining requirements for innovation independently of supporting a whole-industry approach that places passengers and freight users at the centre of decision-making. As discussed in forthcoming Rail Technical Capability Delivery Plan.

Innovation is a complex area, and the industry wishes to work with the Scottish Government to understand the extent of the innovation 'problem', the barriers that prevent the existing incentives framework from operating effectively and the potential mechanisms for addressing these barriers. Inefficiencies in the industry are often related to the operator/infrastructure interface, and the Scottish Government should take the opportunity provided by the HLOS to provide clear direction to the industry – including the ScotRail Alliance - of the outputs it will require and how these relate to its desired outcomes, rather than specifying inputs.

In terms of funding innovatory approaches, these risk premiums could potentially be better managed through Network Rail's overall settlement. This would increase the focus within the industry of understanding these risk premiums thoroughly on a case-by-case basis and ensuring that innovation is considered across the whole portfolio of rail activities rather than as a specific end in itself.

Consultation on Scotland's Rail Infrastructure Strategy

Question 10

'10. Do you support our approach to innovation and new technologies?'

The industry welcomes the increased emphasis on innovation within the rail industry and agrees with the Scottish Government that opportunities to innovate will need to be taken if the cost of maintaining both the operational railway and delivering future enhancements is to be reduced.

However, the industry is not at present convinced of the need for a specific innovation fund. The Scottish Government should focus its attention on ensuring that challenging but achievable incentives are put in place for Network Rail and ScotRail through their respective regulatory settlement and franchise agreements. It should aim to work with the wider industry to identify opportunities, and, where necessary, to assist in breaking down perceived or actual barriers to innovative practices that deliver benefits to passengers, freight shippers and the wider economy.

Technology and innovation

Application of new and emerging technologies can drive significant improvements in industry efficiency, but the pace at which these technologies can be brought on to the railway is often too slow. A programme has been established by the industry to put tools and processes in place for use across the industry and to establish one recognised over-arching programme. This programme co-ordinates research, development and technology to ensure that its outputs are fully connected to what passengers and freight customers need and value. It forms the first stage in addressing the innovation challenge.

Technology is constantly evolving, and presents opportunities to cater for demand in different ways. The railway has to evolve as an integrated system, so technology needs to be researched, developed and applied collaboratively with these outcomes clearly expressed.

Direct investment may sometimes be required to enable government to drive public value from technology investment, where the regulatory and franchising mechanisms are insufficient to drive them on their own or, where disjoins between the two mechanisms, form part of the problem.

The ingredients of innovation are often cultural, and therefore require long term commitment for them to bear fruit. Maintaining supplier and third party investor confidence is key if third party investment is to be exploited fully.

Third party investors can be suppliers, train operators and Network Rail. However, other sources include InnovateUK, the Engineering and Physical Sciences Research Council, the university sector, often in the form of joint ventures and partnerships. Other than Shift2Rail, access to European R&D funding will depend on the outcome of Brexit negotiations.

Understanding drivers of financial performance

Understanding where costs arise, and what the principle drivers of cost are in an industry with a complex structure and varying degrees of transparency is a significant challenge for both the industry and government. Improving the knowledge base on these drivers will be key for controlling the overall cost of the railway in Scotland beyond 2019.

This will be a significant challenge for the industry and for the Scottish Government; it will require the industry to improve its knowledge of its asset base while all parties will need to understand better the interrelationship between infrastructure provision and the operation of services.

Planning on a whole-life basis requires asset management policies to be embedded in industry decision-making processes. Where investment is needed, funders require assurance that planned investments are based on an accurate view of existing asset condition. The Periodic Review process, and the data gathering exercise it drives, is important for improving the level of knowledge in the industry.

Another key element of the evidence base that the industry and government needs to consider is the Scotland Route Study, published in 2016. The Scotland Route Study provides an up-to-date understanding of the capability of the existing network in Scotland, identifying the key constraints and where infrastructure-based interventions may be required while also identifying opportunities and trade-offs that are most likely to yield the best outputs.

High quality planning requires an understanding of how decisions in one part of the industry can drive costs elsewhere in the industry. Achieving a common understanding of these impacts and designing incentives around them will enable a better alignment between industry parties.

The railway in 2019 and its challenges

Understanding Renewals/Maintenance/Operations trade-offs

Network Rail is one of the largest asset management organisations in Britain, with a diverse portfolio of assets. In Scotland this includes approximately 5,000 bridges and tunnels, 358 stations, 4,500 miles of track reaching over 440 miles of electrified railway by 2019.

To meet the forecast passenger and freight growth on the rail network and achieve the performance outputs that are likely to be specified by government beyond 2019, the railway will need to be increasingly reliable and more resilient to extreme weather.

Efficiently operating, maintaining and renewing the network assets are a key industry requirement that Network Rail will address in its Strategic Business Plan to be published later in 2017. Network Rail is best placed to manage its assets; however, the industry recognises the need to have a sustainable asset management plan that is in line with Scotland priorities and the national asset policies which place particular focus on initiatives to address risks such as severe weather.

Asset Management Strategy

Scotland's rail network, like other networks throughout the world, is being increasingly affected by adverse weather conditions. This includes issues such as ice, snow, heavy rain, lightening and high winds which can all lead to asset failures resulting in disruption to passengers and freight customers. Recognising that the number extreme weather events encountered in Scotland has significantly increased over recent years has led to the need to specifically target schemes that will improve weather resilience. These schemes are likely to include drainage solutions to reduce the impact of flood events and remediation of the poorest condition earthworks susceptible to heavy rainfall.

Asset information is critical to maintenance and renewal decisions. Taking advantage of data-driven maintenance and renewals plans based on 'predict and prevent' is at the heart of the industry's thinking in this area. This approach utilises remote condition monitoring, risk-based maintenance, train-borne measurement and other technologies to inform the right asset intervention at the right time. Used appropriately, this approach has the potential to significantly reduce levels of unplanned disruption to passengers and freight users. Examples of such systems include fibre optic rock fall detection and slope stability monitoring.

Maintenance Strategy

Network Rail's future maintenance strategy is proposed to be consistent with its CP5 plan, recognising the significant increase in electrification asset base and with increased focus on resilience. Management of vegetation will build on the significant vegetation clearance undertaken in CP5. Other activity will build on the successful implementation of risk based maintenance in CP5 and the utilisation of technology to reduce the requirement for site visits and manual interventions, minimising the number of line side visits and exposure of the workforce to the associated risks.

Digital Railway

Innovative ways are required to increase passenger and freight capacity on Great Britain's rail network, which is becoming increasingly congested at peak times as demand exceeds capacity in many places. This constrains train frequency and performance and the availability of freight paths. This leads to a poorer service for passenger and freight customers.

Rail has the opportunity to make use of existing technology, such as the European Train Control System Level 2 (ETCS L2), Traffic Management and Connected Driver Advisory System, to help address these challenges. Versions of these systems are currently being used on the London Underground and are due to be deployed in the coming months and years on Thameslink, Crossrail and HS2. These systems allow trains to run faster and much closer together, freeing up more capacity in the existing rail infrastructure, permitting more frequent and more reliable services to operate.

There is an ongoing requirement to replace signalling assets in a number of key locations in the future, providing the opportunity to modernise train control in a cost effective way. Doing so will result in a sustainable asset base and could deliver a range of significant capacity, connectivity and performance benefits.

National Operating Strategy

Network Rail is continuing to identify opportunities to reduce operating costs in Scotland. The National Operating Strategy seeks to improve the efficiency of frontline operations by migrating operational management from disparate locations to a single Rail Operating Centre (ROC) located in Glasgow, supported by Edinburgh, Inverness and Banavie Signalling Centres. From 2019, there are proposals to close a number of signal boxes driven by the condition of the assets and the cost of operating them. In the longer term, the signal box closures will achieve a reduction in operating costs following the migration of control to the ROC or Signalling Centres.

The railway in 2019 and its challenges

Property

Network Rail has a significant portfolio of property assets dispersed across Scotland. The aspiration of the property team is to create exceptional places, from the station and property assets, for passengers, business and communities. The property activities generate significant revenues which are reinvested to help create a better railway.

There are a number of opportunities being delivered through greater collaborative working between Property and Network Rail in Scotland. These include:

- Completion of an Estate Management Plan on a key route basis that includes right sized, safe and fit for purpose staff office, meeting and training accommodation at optimum locations throughout the route

- Legally constituted and safe pedestrian and road to rail access points onto the network that minimises delay per incident risk, but maximises the constructive on the ground repair time

- Land acquisition programme that recognises current and future network capacity constraints and seeks to make early purchases to prevent future ransom situations or lengthy processes

- Completion of registration of title by the end of the 2019 deadline date removing risk of title challenge by third parties

- An investment programme that ignores existing Network Rail/train operator/freight operator boundary constraints and delivers what is right for the industry, freight shippers and the travelling public

- Investment in underdeveloped assets, either bringing properties back into use and minimising on internal holding costs or in demolition by removing property liability from the estate.

In order to deliver the above, an appropriate level of funding will be required in CP6. Network Rail will aim to provide details of the indicative funding requirements in advance of the HLOS.

04 Measuring Success

Outcomes and Outputs

The High Level Output Specification (HLOS) is the Scottish Government's opportunity to specify outputs it wants Network Rail (and, indirectly, the wider industry) to deliver.

Setting an outputs framework that adequately reflects the direction the Scottish Government wishes to set for the industry is a complex task, and even a supposedly 'optimal' outputs framework is likely to have unintended consequences.

The principal advice is that the framework of outputs and measures that the Scottish Government requires after 2019 needs to be considered carefully. It needs to be prepared transparently and issues need to be worked through together.

The advice that follows therefore focuses on establishing useful principles for establishing measures and outputs rather than commenting on the specific merits or dismerits of specific proposals for outputs and measures.

Measure what is meaningful

As described earlier, the Scottish Government will maximise the return on its investment in the railway where the railway is incentivised to be market-focused. The outputs and measures that the Scottish Government establishes therefore also need to be consistent with what passengers and freight customers want.

The current Public Performance Measure (PPM) is clearly imperfect in this respect. Both the industry and the Scottish Government are looking beyond this metric in the current ScotRail Performance Improvement Plan to focus on the outcomes for passengers rather than trains.

The key to establishing a credible view of train punctuality and performance will therefore be to identify measures and outputs that customers value, and this is likely to vary depending which markets are being served.

For instance, on high frequency commuter networks, punctuality is likely to be less important than maintaining service frequency. On these types of route, a performance regime that focuses on the headway between trains may be more appropriate than one which prioritises 'right time' performance.

Conversely, on longer distance, lower frequency services, service punctuality is likely to be a higher priority for passengers because it will more directly affect their overall journey time.

In practice, train services often serve more than one market, so mapping the appropriate performance regime to a train service will inevitably involve compromise. There are clearly a number of potential approaches to establishing a meaningful performance output, and the Scottish Government needs to consider whether a single metric – whether set as an output or a measure – will ever adequately capture this. An alternative could be to differentiate performance outputs for each of the five service groups in Scotland.

Where it is not feasible to establish direct outputs that are meaningful, the industry would advise the Scottish Government to focus its activities on developing outputs that can act as accurate proxies for the outcomes it is prioritising. A risk for the Scottish Government is that, where outputs are not closely linked to outcomes, it may inadvertently incentivise the railway to focus on the output at the expense of the outcome.

Choosing between measures and outputs

A choice for the Scottish Government is to decide whether or not to set outputs for specific areas of activity or whether to establish measures. The key issue here is the trade-off between the risk of creating perverse incentives and the risk of implying a lower value for measures than for regulated outputs.

An issue that the Scottish Government will also need to consider with the ORR is the degree to which – in a post-reclassification world – there is a fundamental difference between outputs and measures. The answer to this question will depend on the wider question of Network Rail's incentives, and this is something that the industry will work with government and the ORR to address in the coming months.

Viewing the outputs framework in the round

It is impossible to comment on the value of specific measures or outputs without considering them as a totality. The incentive power of specified outputs (both reputational and financial) may vary considerably, and changing the value of one output can have unintended consequences in behavioural terms. Again, the industry believes that there will be immense value in working together with the ORR to develop a challenging but deliverable suite of outputs and measures that will help to deliver the outcomes that the Scottish Government want to achieve.

05 Developing Choices for Funders

Recognising and responding to CP5 challenges

Network Rail has stated previously that certain elements of the current programme of enhancements have not been delivered as planned. It accepts the findings of the Ernst & Young Review and takes responsibility for the failures that were attributed to it in that document.

Network Rail's transformation themes – the 5 'Cs'

As Network Rail responds to the challenges it faces, it is focusing on the following transformation themes:

Customer driven – customers are the life blood of private sector businesses and Network Rail must consider them in the same way. Devolution to Scotland has already created an organisation closer to customer needs and far better placed to be able to meet and exceed them.

Cost competitive – Network Rail cannot hide behind its monopoly status; it must demonstrate that it spends every penny as if it were its own.

Commercial – private sector businesses succeed by attracting investors. Network Rail needs to use private capital to improve the railways, not just public money. That means finding commercial mechanisms to reward investors and it means attracting funding from others that derive their benefits directly from the improved transport links, such as property developers.

Culture – too much of Network Rail's culture and ways of working have deep roots in past practices. The culture in successful manufacturing industries today is transformed from that of years ago – Network Rail needs a mind-set of 'better every day', and embed a more inclusive, diverse, safety conscious culture that has continuous improvement at its heart.

Capacity – the huge growth in railway travel continues at pace and it is expected that passenger numbers to double in the next 25 years which is why the roll-out of digital technology is so important to address future capacity issues.

Figure 5.1 : Network Rail's transformation themes

Developing Choices for Funders

Network Rail has an established devolution programme, moving power from the centre to increasingly autonomous routes, including a 'virtual' freight and national passenger route. This programme established the new operating model that was adopted in 2016. See figure 5.2.
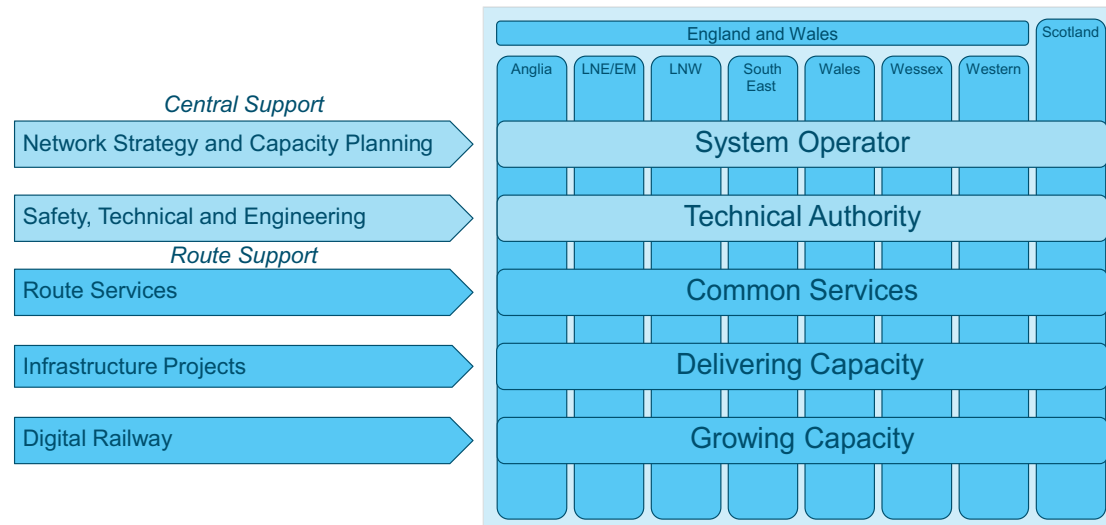

Figure 5.2 : Network Rail's devolved operating model

Network Rail's Must Wins

Network Rail has experienced significant change during the first half of the current control period including re-classification and multiple reviews (Bowe, Hendy, Shaw). Underlying performance at a GB level is falling short of original expectations, and Network Rail must focus its efforts on a few things that will make a real difference: 'Must Wins'.

- Successfully implement planning and delivering safe work

- Train performance – reducing the 'Delay per incident'

- Renewals Recovery – delivering volumes and unit rates in line with plan

- Enhancements – delivering our commitments from the Hendy plan

- Digital Railway – a foundation for CP6.

Underpinning these five 'Must Wins', which each have clear metrics against them, are two essential enabling programmes/cultural changes:

- Embracing a culture of Better Every Day across the whole business through continuously improved working procedures and

- Route transformation plan – developing strong route-led businesses through further devolution.

Network Rail aims to be a very different kind of company. The 'Must Wins' are significant game changers and all support Network Rail's role to deliver a safe, reliable, affordable and growing railway.

Consultation on Scotland's Rail Infrastructure Strategy

Question 3

'3. Do you support the move to a more flexible 'pipeline' approach to scheme delivery, that does not force us to make early decisions on a detailed specification prior to the commencement of the five-year regulatory control period, without receipt of a robust business case?'

The industry strongly supports the move to an enhancements 'pipeline'. It views the adoption of this approach to be both unavoidable – given the change in Network Rail's status - and highly desirable from the perspective of enhancement project development, risk management and delivery optimisation.

Working on a pipeline basis will also permit enhancements to be more efficiently managed by the industry's supply chain. The benefit of avoiding investment 'bow waves' - driven by regulatory cycles rather than by market conditions, funder aspirations or asset condition – is a key learning point from the industry's delivery failures in CP5. The proposed approach is also consistent with the possibility that enhancements may have more than one funder, for instance in partnership with the various City Deal Partnerships that are currently in place across Scotland.

The proposed approach will require the industry and the Scottish Government to agree a common understanding to developing and resourcing projects. Network Rail is currently working with Transport Scotland to agree a Memorandum of Understanding (MoU). Agreeing the principles supporting the MoU and its implementation needs to be a priority for both parties before the publication of the HLOS.

Developing Choices for Funders

Recognising changes in industry funding

The change in Network Rail's status to a public sector body has provided a fundamental challenge to the industry, its regulator and to government. The funding environment has moved on from being one that was complex but flexible to one which is conceptually simpler but also more rigid in its application.

This provides clearer signals to government, as the incentives to invest in infrastructure and operations are now better balanced than they were under the Regulatory Asset Base (RAB) framework when Network Rail was operating as a not-for-dividend company.

The previous funding settlement allowed the Regulatory Asset Base (and therefore the rate of return that Network Rail could achieve) to be uprated if Network Rail could demonstrate that overspends were efficient (for instance, if the scope of a project had changed subsequent to the regulatory determination). In the current fund, the flexibility to proceed on this basis is much reduced. This increases the emphasis that needs to be placed on government and the industry agreeing the scope of enhancements at an early stage and retaining the agreed scope through to delivery.

This is a positive development, and has been strongly welcomed across the industry. However, it means, firstly, that the early development phases of projects become even more important elements of the project life cycle than they have hitherto been and, secondly, that the balance of funding will need to be adjusted to reflect this.

The changes to industry funding have led to the publication of a "Memorandum of Understanding" (MoU) between Network Rail and the Department for Transport in England and Wales. One of the outcomes of the England and Wales MoU has been the roll out of the "5-case" business case model for enhancement schemes that occur under its jurisdiction.

Integrating this model into Network Rail's governance model has been challenging, but the disciplines it introduces around identifying financial, economic, commercial, management and strategic risks at the relevant stage in the project lifecycle are proving to be a valuable aid to decision making. The industry advises that the forthcoming Scotland MoU should follow the principles and processes established in the England & Wales MoU in relation to business case development.

Developing the Industry Asset Base: Enhancements

Developing a strategy for planning major investment

For the railway to play its part in supporting the overall economic strategy for Scotland, the industry and its funders need to reach a common understanding of the challenges the industry is likely to face in the future and the obstacles that could prevent funders from meeting their objectives.

The difficulties encountered in implementing the CP5 enhancements programme underlines the degree to which long-term planning needs to be married to long-term political commitment.

For example, the decision on whether or not to progressively electrify the network has implications across the industry that cannot be easily reversed (or can only be reversed at significant cost). It is for the industry to set out clearly the implications of following a certain investment trajectory, but only funders can specify the outcomes that they want to achieve and fund.

Again, a case in point here is electrification: electrification can support the delivery of improvements that passengers and freight customers value, but it is a means not an end. Specifying electrification directly, without taking account of other important considerations, such as rolling stock and depots, potentially undermines the achievement of the outcomes that funders want to achieve.

A continuous approach to planning: the pipeline

The Long Term Planning Process (LTPP) has focused on developing a range of potential investments that could be packaged up into a Periodic Review settlement for implementation in the subsequent Control Period.

Including most enhancements in the Periodic Review process was desirable for the Scottish Government at the time, because it provided certainty around its infrastructure commitments for the full five years. This certainty was particularly desirable in the last Periodic Review cycle because Transport Scotland was in the process of re-letting the ScotRail and Caledonian Sleeper franchises at the time.

However, unlocking the potential of the network is best delivered through a consistent and continuous approach to planning. Opportunities and synergies are identified throughout the development and delivery of projects, but the greatest potential to deliver efficient intervention exists at an early stage in the process. A "pipeline" of proposals – if developed and resourced appropriately - can support delivering best value and ensure that future improvements are optimally-timed and integrated with other industry planning.

Developing Choices for Funders

A key point to note is the need to ensure that a long-term vision is developed for each corridor on the network. It is this vision which will be progressively delivered through the enhancements pipeline when it is most efficient to do so, and when funding is available. It will be the role of funders and stakeholders to develop this long-term vision for each corridor based on their local and national economic and social objectives; it is for the industry to develop a package of interventions ("the pipeline") that is required to deliver this vision.

The Scotland Route Study developed a vision for the current network that the Scottish Government strongly supported, and this is the foundation on which the current pipeline is planned. Where new interventions are proposed (for instance, new stations or new railway), these should be incorporated into the corridor vision to ensure that they are consistent with the overall objectives of funders. The System Operator will then be responsible for updating the package of interventions required on a periodic basis (as it currently does through the Route Study programme), with updated business cases taking into account changes to funder objectives and funding constraints, and changes in market conditions.

The scope and complexity of the rail network requires integrated approaches to strategic planning and development. Funders and stakeholders need to take this into account when proposing investment and improvements. For example, an additional train service can have an unintended, though tangible, impact on overall network performance, while disruption costs caused by construction works can also undermine the overall business case for investment.

In contrast, investing in rail capacity in one part of the network can also unlock opportunities across other parts of the network and enable benefits to be realised in different markets and different geographical locations. For example, one of the primary benefits of reopening of the Stirling-Alloa-Kincardine line in 2008 was the removal freight flows off the Forth Bridge, thus allowing these train paths to be recycled into passenger use.

Having a clear specification and business case at the earliest stages of project development is important in taking forward proposals that are both robust and deliverable. The case needs to be evidence-based within the context of wider national and regional strategies. It also underlines the importance of allocating an appropriate level of resource to early stage development.

However, one implication of this approach is that in order for risks to be managed down, a defined proportion of enhancement spending will need to be assigned to the development phase of projects. This will need to be reflected in both the Statement of Funds Available (SoFA)[1] and in the ORR's Final Determination[2] if the approach is to work efficiently.

Principles on which the enhancements could be based

The industry considers that the best value and most effective delivery of improvement requires:

- A "package" approach to be taken – improving strategic outcomes to reflect routes and markets in their totality when developing plans for the future. Ensuring that activity is directed towards the overall system outcome, including integration with decisions around rolling stock procurement, train service specification, station and civic realm developments, and optimising the impact of delivery on the customer.

- Incremental development – where major investments are planned to achieve long-term strategic outcomes for the railway, they should be planned and phased to bring forward benefits and timed to coincide with asset renewals. This ensures that future requirements for improvements are reflected in planning the maintenance and renewal of the current railway.

- Whole-industry planning – where new enhancements are planned, these will be delivered through a combination of making use of existing assets and new investment, building on opportunities that arise as a result of the planned renewals cycle. The interaction of infrastructure capacity and train services needs to be optimised if resources are to be employed to their best effect. The ability of the industry supply chain, and the wider industry skills base, to deliver and support service improvements is fundamental to ensuring risks are identified as early as possible and mitigated appropriately in the development process.

- An acknowledgement that enhancements may be required to maintain current service levels if the network is to cope with increased demand and increasing environmental challenges in the future, even where there is no desire on the part of funders to improve the services provided to passengers and freight customers.

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1 The Statement of Funds Available is the companion document to the HLOS, setting out the financial envelope within which the HLOS-specified outputs must be delivered.
2 The ORR's Final Determination sets out the outputs that Network Rail must deliver during the next Control Period, and the funding that is available to deliver these outputs efficiently.

- Flexibility – the rail network's long asset lives and high asset costs mean that investments often take a significant amount of time to develop and fund, including integration with the strategies for the current network. One of the key insights of the Hendy and Bowe reviews was that the industry should move towards a more focused approach to enhancement projects, and that clear linkages need to be established between enhancements and the overall business case for investment. Project development timetables need to be driven by the outputs required – and what the supply chain can realistically deliver - rather than focused on the funding and specification cycle defined by the Periodic Review of Network Rail.

Supply chain

One major benefit of adopting the proposed pipeline approach would be the increased certainty provided to the industry's supply chain and achieving more consistency of volumes in the future.

In order for the benefits of this to be realised (i.e. in terms of cost reductions), there needs to be a relatively high degree of certainty about the levels of funding that is likely to be available.

As Hendy highlighted, the recent problems with enhancements in England and Wales (such as the Great Western Electrification Project) are in part a result of a sudden concentration of activities (i.e. electrification) which the

supply chain was unable to cope with. The supply chain's failure in this respect is the industry's (and, in particular, Network Rail's) failure over a significant period of time. The change in Network Rail's status brought these failures into sharp relief, but it also provides an opportunity for the supply chain to be managed more effectively.

A new approach to business case development

As in the England & Wales MoU, the proposed Scotland MoU breaks the project life cycle into a series of decision points. These decision points are informed by:

- First, the approval of the Strategic Outline Business Case (SOBC). This makes the case for rail enhancements and how they contribute to the Scottish Government's objectives. It results in a commitment to develop outline schemes

- Second, the approval of the Outline Business Case (OBC). This considers options and results in a commitment to design the preferred option

- Third, the approval of the Full Business Case (FBC). This confirms the value for money of the preferred option and the engineering design that underpins definitive cost, time, resource and risk estimates. This decision results in a commitment to deliver at an agreed price and level of risk.

Early Project Development Stages	Project Delivery Stages
Schemes may be prioritised for development if they:	**Schemes may be prioritised for delivery if they:**
• efficiently support defined Scottish Government/Transport Scotland strategic objectives	• continue to efficiently support defined Scottish Government/Transport Scotland strategic objectives
• efficiently support/enable other industry initiatives that are already committed for delivery	• retain a positive investment case and remain affordable
• efficiently support/enable/enhance other industry initiatives that are committed for development	• efficiently support/enable other industry initiatives that are also/already committed for delivery
• are linked to planned renewals or other third party investment, supporting more efficient delivery	• they strengthen overall network capability (e.g. capacity/journey times/resilience
• have a positive investment case at completion of GRIP 4	• are clearly demonstrated to have a stronger investment case than alternative options (e.g. rolling stock, timetable or other operational initiatives) that would deliver same outcome(s)
• are schemes that are fully funded by third party promoters for development/delivery.	• are linked to planned renewals or other third party investment, supporting more efficient delivery.

Table 5.1 : Project development stages

Responsibility for ownership and management of business cases will become more clearly defined so, while the Scottish Government investment will retain responsibility for considering the overall impacts on rolling stock, franchises and infrastructure, the advice on which these decisions are made will be provided by the System Operator . An investment decision point may be repeated following a change either within the programme or externally. Schemes may be rejected at any stage subject to appropriate governance and regulatory arrangements.

All rail infrastructure enhancement proposals will be considered on a case-by-case basis although Table 5.1 identifies some prioritisation criteria that may be applied

Consultation on Scotland's Rail Infrastructure Strategy

Question 7

'7. Do you agree with the proposed approach to specifying performance outputs?'

As discussed in the industry's response to Question 2, network performance has to be considered in the wider context of the outputs that the Scottish Government needs the railway in Scotland to provide. Choices that enhance other forms of connectivity – most notably changes to service frequency or new train services (for instance, by extending the network or by opening new stations) – can have effects on performance, and these need to be recognised by funders when setting performance outputs.

As 70% of delay minutes are secondary, and therefore related to traffic volumes, the specification of performance outputs and measures need to be considered carefully by the Scottish Government working with the industry to put passenger and freight expectations at the centre of their specification.

The industry's advice is that the performance outputs that are specified should, firstly, reflect how passengers experience delays so that the railway is incentivised to deliver what passengers actually value rather than creating an abstract measure and, secondly, be the result of a collaborative policy development process that ensures that any unintended consequences of alternative approaches are identified as far as is reasonably possible.

The proposal contained within the Rail Infrastructure Strategy document to set an output based on the value of delays is interesting, and is certainly something the industry would like to explore further with the Scottish Government as part of a broader exercise.

The performance challenge

The industry is focused on achieving and sustaining the current performance targets set by the Scottish Government. Whilst there have been a number of challenges with performance in Scotland over recent months the ScotRail Alliance is committed to delivering its Performance Improvement Plan, published in October 2016. The plan sets out actions that are being put in place to improve service reliability and to ensure that the train infrastructure – including points, tracks and signals – operates efficiently.

The industry recognises that the recent growth in passenger demand is likely to continue, although the rate of growth is subject to considerable uncertainty. However, accommodating service improvements in a response to demand growth will increase the industry's performance challenge. The Scottish Government should therefore consider the performance implications of improving service provision when it specifies additional service enhancements.

There are specific locations on the network in Scotland (for example, in the vicinity of Hyndland and Rutherglen) where there is little tolerance for any
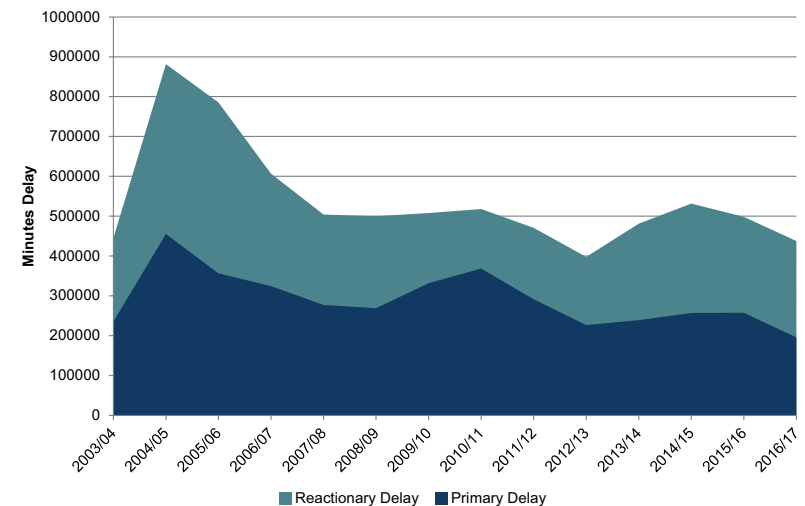

Figure 5.3 : Graph showing relationship between primary and reactionary delays (Source ScotRail performance team[1]

1   Primary delay relate directly to infrastructure and train failure; reactive delays are delays to subsequent traffic

disruption because of volume of trains using the network. Seventy per cent of delays on the network in Scotland are reactive rather than being the direct result of an asset or train failure. This explains in part why the rail industry has struggled to meet performance targets in the current control period, despite asset reliability being at record levels.

Performance on the main routes in Scotland is constrained in large part by the physical infrastructure. For example, a late running cross-border service operating between London and Aberdeen or Inverness can drive significant delays across the network in Scotland if the train cannot achieve its timetable slot to travel north from Edinburgh. These performance issues are exacerbated where opportunities to recover services is restricted by single line infrastructure or signalling constraints.

As growth continues, there will be an increasing risk of network congestion building up from longer station calls, necessitated by a significant increase in passenger numbers. This is particularly true of the high density commuter network around Glasgow where services are busy and station stops are frequent. At present, many of these delays are relatively minor on an individual basis but significant cumulatively. The problem is exacerbated during periods of wet weather, where boarding can become more problematic due to passengers congregating on covered platform areas rather than being distributed along the whole platform length. These types of delays can be minimised by improving platform infrastructure i.e. more or longer shelters.

The current timetable does not accommodate the variability in station dwell times throughout the day. Although this variability does not directly impact the ability of a train to achieve its point-to-point Sectional Running Times (SRTs), small changes in dwell times build up on a corridor meaning that minor individual problems become more significant as they accumulate.

As more and longer trains are being run into Scotland's key terminal stations, capacity at these stations is becoming more constrained. Firstly, platform availability at stations with platforms of varying lengths adds to congestion on the approaches to these stations (at locations where the knock-on impacts of delays tend to be highest). Secondly, increasing numbers of passengers mean that it takes longer for passengers to alight and board. In some cases, longer trains can only just be accommodated in the available platforms. This means that drivers tend to approach their stopping place more cautiously. This is likely to be a key constraint for Glasgow Central Station High Level.

Further work is needed to develop a deeper understanding of the issues and support the development of a longer term strategy, building on the current work already being undertaken by the ScotRail Alliance.

Freight and cross-border passenger performance

The Freight Delivery Measure (FDM) is the core regulatory requirement laid down by the ORR and designed to highlight Network Rail's performance. It focuses on Network Rail's ability to deliver commercial freight trains to destination successfully, notwithstanding commercial freight operator caused issues that may have resulted in a delayed arrival.

The FDM target is defined as:

- Commercial freight services arriving at planned destination early, right time or within 15 minutes of right time

- Commercial freight services arriving at planned destination with less than 15 minutes of Network Rail or non-commercial freight operator caused delay.

The regulatory threshold for FDM is currently 92.5%, with performance below this number subject to ORR intervention.

Against the backdrop of unprecedented change in the commodity base and operational geography of rail freight, there is industry consensus around retention of FDM as the regulatory freight metric beyond CP5 and adoption of an initial 93% regulatory floor with an industry aspiration to achieve subsequent staged improvements toward achievement of 95% within 5 years.

Meeting the freight performance targets can be challenging during times of passenger service disruption and the need to keep freight moving balanced against recovering the passenger timetable. Mitigation plans are in place in joint control centres to address these scenarios when they arise.

Cross-border service performance is important both for passengers and the network as a whole. The same challenges exist with respect to a strong and robust timetable as for ScotRail services, interacting with other passenger and freight services on congested parts of the national network. Performance targets are set within franchise agreements for cross-border operators. The industry recognises that a strong System Operator function and interaction with Network Rail Routes is required to ensure that these important services are delivered consistently and reliably.

Focus on supply chain and workforce planning challenges

Rail's outputs emerge from a supply chain built from a variety of businesses, including an infrastructure manager, rolling stock suppliers and financiers all of which contribute to or enable a service that is ultimately delivered by train operators.

The effectiveness of a supply chain can be undermined where any one link in the chain breaks down, and funders need to understand how vulnerabilities in one part of a supply chain can undermine decision making in other areas. These vulnerabilities can include:

- An ageing workforce, which jeopardises the future efficiency of the industry where it leads to a skills shortage and where succession planning is not in place

- An adversarial industrial relations environment, which stifles the ability of the industry to innovate and adapt to technological change while also undermining staff development
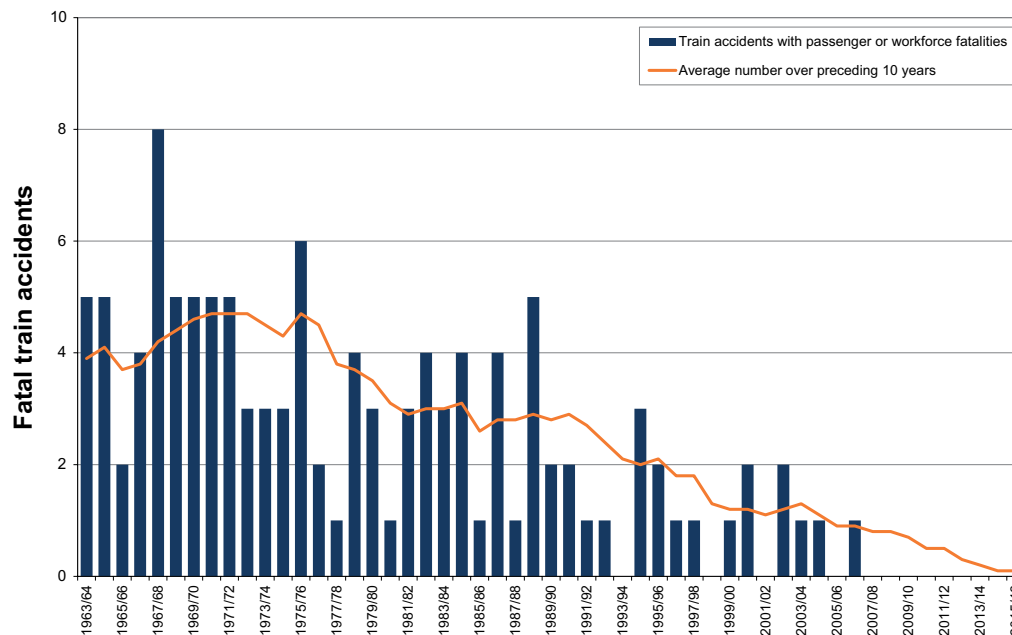
- Policies on staffing (i.e. a reliance on overtime to minimise staff costs) which meet short term financial objectives but which introduce risks further downstream (i.e. the impact of overtime bans) need to be considered with a long-term perspective

- Investment uncertainty, where uncertainty around future investment in one part of the supply chain undermines confidence at another, making the supply chain less responsive and investment less effective and affordable.

Consultation on Scotland's Rail Infrastructure Strategy

Question 9

'9. Do you have a view on our approach to safety? How can the closure of level crossings be better supported?'

The same legal framework for railway safety applies in England, Scotland and Wales and Railway Group Standards also have a GB-wide scope. The industry supports this position because it ensures that both transport operators and their users (particularly users of cross-border services) have consistent messaging and are able to make decisions based on a common understanding of best practice.

Level crossings will remain the highest risk locations on the rail network, and funding which is allocated on the basis of the Fatalities and Weighted Injuries (FWI) will inevitably allocate safety funds to the most populous parts of the GB network. However, ALCRAM and its FWI calculation does take into account the low traffic volumes and low user volumes in terms of it being a risk, but we do not have sufficient crossings that sit in the high linespeed usage category to compete with other crossings on GB rail. This presents a problem in so far as the risk ranking at level crossings will always be compromised by line speed and traffic improvements which can ultimately stifle route enhancements, therefore it would be desirable to deal with crossings now based on a 20-30 year plan. To continue to improve safety over existing level crossings where closure is not an option, the funding which is currently provided by Westminster Government enables some safety benefits to be fitted to existing crossings to give FWI benefits. However, additional funding could also benefit the performance on some routes on which the crossing is placed by upgrading or adding safety benefits which could enable the line speed to be increased but providing the necessary safety to the public. There is a need to ensure that this type of funding is also considered when use of the closure fund is not an option

The Scottish Government's £10 million level crossing closure fund in the

Figure 5.4 : Fatal train accidents GB, 1963-2016

current control period was a particularly welcome recognition of this aspect of rail safety and the industry would welcome a continued commitment in this area beyond 2019.

However, even despite the support provided by GB and Scottish Government funding, the number of level crossing closures that are likely to take place in Scotland is not as high as the industry would have liked.

The reasons for this are complex, but relate as much to wider land use policies as they do to funding. The 2016 Land Reform Act Scotland would add additional steps to level crossing closures, particularly in relation to rights of access over private level crossings. The industry would like to work with Scottish Government and local authorities to address some of these challenges.
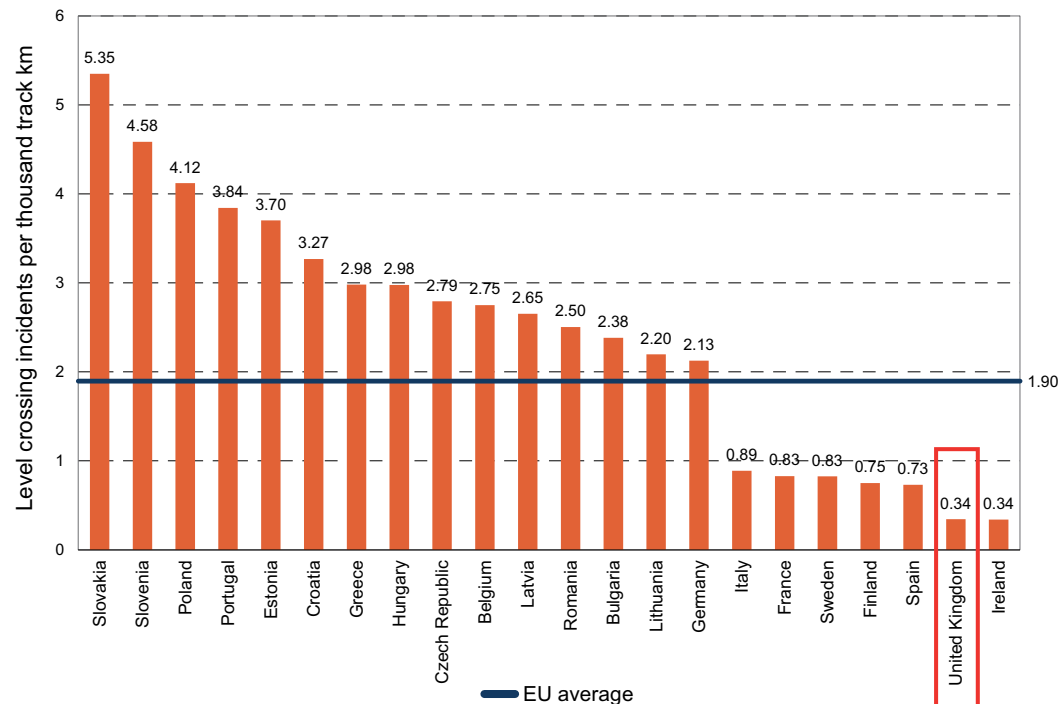
Safety, health and sustainability

Safety will remain the industry's priority. The GB rail network is among the safest in Europe and the industry's objective is to maintain safety, and improve it where reasonably practicable. This is paramount in the delivery of a high quality travelling environment for rail users as well as supporting wider transport objectives in this area.

There has been good progress in improving workforce safety, train accident risk and significant progress with regard to improving level crossing safety over recent years, but the industry needs to maintain its focus on closing level crossings and introducing new technology to reduce the level crossing risk. However, there is still much more to do.

The industry cannot afford to be complacent, and the recent extreme weather events are a reminder that continuing investment in railway assets is a key requirement for the safe operation of trains. Since the Loch Treig derailment Network Rail in Scotland has introduced stringent measures to control train collision with earthwork failure. Although an effective measure in reducing the consequence of running into an earthwork failure it does make service delivery more challenging. This incident acts as a reminder that civil engineering assets, such as embankments and cuttings, are often rails oldest assets. They require appropriate levels of investment if they are to be sustained. It is also critical the industry becomes smarter about how assets are managed.

The challenge for the industry is to maintain and improve on its existing record while taking advantage of opportunities to reduce industry cost. The industry needs to define and address the challenge of working together to incorporate technological change in a safe and efficient way so that rail can make the greatest contribution possible to overall transport system safety.

Managing Industry Assets: Rolling Stock/Depots

Developing a long-term rolling stock and depots strategy

The rail network operates as an integrated system, irrespective of the institutional and contractual arrangements within the industry. Rolling stock is – along with stations - the key passenger interface on the railway.

Rolling stock management is an area where the industry can control its costs over the long-term – if the incentives are right, and if there is long-term policy direction. In terms of incentives, Network Rail is incentivised via its licence to plan the network in a way that is consistent with long-term efficiency. TOCs

Figure 5.5 : Number of level crossing incidents GB per thousand track km, 2010-14

inevitably plan over a shorter time frame, and this difference in planning windows inevitably creates a tension within the industry that funders can help to reconcile.

Ultimately, the industry and its funders need to have long-term strategy that takes account of:

- Changing market conditions
- Future rolling stock cascades
- Network reliability.

This needs to reflect both current and potential requirements for capacity, taking into account opportunities that are likely to emerge from across the GB network. It will need to be integrated with planning for, and delivering the provision of, appropriate depots and stabling facilities, especially if future electrification schemes are to be planned and delivered effectively and affordability.

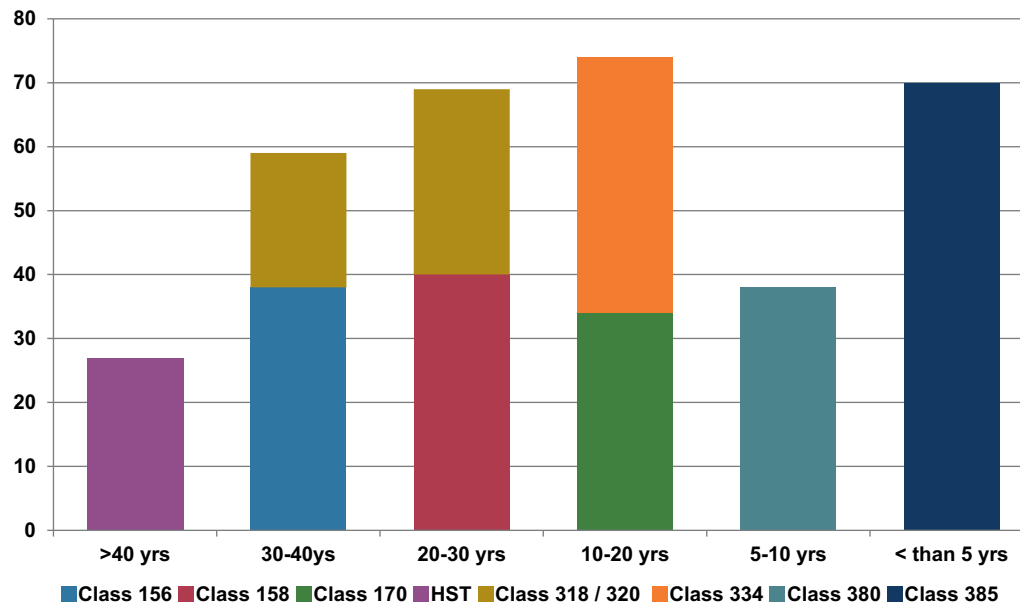The industry believes that rolling stock and depot planning needs to be

ongoing and transparent to be integrated into wider strategic and project developments. Ensuring that the appropriate rolling stock operates on any given route can significantly reduce the cost of enhancements, particularly on heavily graded routes such as the Highland Main Line, and a having long-term strategy that is integrated with infrastructure plans is therefore key.

The GB industry's Long Term Rolling Stock Strategy is the starting point on which such a strategy can be based, and it is updated annually. Developing a strategy for Scotland will be challenging, as Scotland-focused policies will need to be balanced against the constraints of a GB-wide rolling stock market in which the Scottish rail industry is a relatively minor player.

As the funder of the railway in Scotland, the Scottish Government has to support this strategy. However, there could be advantages in assigning responsibility for managing the strategy to the System Operator as part of the Long Term Planning Process in Scotland.

Rolling Stock

ScotRail

The Scottish Government is investing £475m in the ScotRail rolling stock fleet during the current funding period, complementing the investment of £1.4 billion in major route enhancement projects being delivered. All existing rolling stock will undergo major refurbishment, two new fleets will be introduced (Class 385 Electric Multiple Units (EMUs) and High Speed Trains (HSTs)) while more British Rail (BR)-generation EMUs will also be operated. The oldest vehicles (Class 314) will be withdrawn from service. The 2016 position is set out in Figure 5.6:

Agreements are in place which guarantee the lease of the refurbished HST fleet until 2030, and the Class 385 fleet until 2042 as a minimum. Contract options exist to procure more Class 385 EMUs and to convert some of the 2+4 HST sets to 2+5 formation, by 2024 if required.

By enacting existing contract options, and assuming that more BR- generation EMUs (Class 318-321) continue to be displaced through modernisation programmes in England & Wales, there appears to be sufficient EMU fleet capacity to meet likely industry needs up to 2024. However, additional DMUs are likely to be required to manage growth in to 2024 and it is assumed this will be achieved through the cascade of rolling stock following electrification. Beyond this date, a number of key issues will need to be addressed as older rolling stock reaches the end of its useful life.

Figure 5.6 : ScotRail fleet in 2019 by age

Long distance services

All cross border operators are expected to introduce brand new rolling stock to improve customer experience and to accommodate growth on these routes. This roll out is anticipated to commence from late 2018 and will continue through until 2024. The introduction of High Speed services, following the opening of Phase 1 of HS2 in 2026, will also introduce new rolling stock.

Depots and Stabling

Stabling

Stabling facilities allow trains to be held out of service, cleaned and refuelled. Ensuring that the appropriate stabling facilities exist at the appropriate locations is one way by which the industry can control its operating costs.

During the current control period, increased stabling capacity will be provided at both Millerhill and Eastfield to accommodate the new class 385 EMU fleet. Haymarket and Inverness depots are currently being modified to stable and maintain the HST fleet. A scheme to deliver a new light maintenance depot at Perth has been developed. However, delivery of this facility is currently on hold pending the identification and acquisition of suitable land and funding.

Train diagrams constructed on the basis of the 2019 timetable suggest that the number of vehicles requiring stabling at Perth is likely to increase from the current 50 per weeknight to 98. It is accepted that a new facility will not be available at Perth in time to accommodate these units, and contingency arrangements are being developed. However, this facility will be required early in the next control period to avoid performance being adversely affected (particularly during the winter) and if the financial and environmental impact of increased empty coaching stock (ECS) moves is to be avoided.

It is proposed that an assessment of stabling requirements out to 2024 should be undertaken during 2017 in order to inform the development of stabling facilities required.

Depots

Depots carry out routine maintenance and servicing on the rolling stock fleet, both for ScotRail and for long distance operators. Suitable maintenance and servicing facilities are being delivered for the new fleets being introduced across Scotland during CP5: Sleeper, IEP, AT300, class 385 and HST.

Clayhills and Inverness depots both have skilled work forces and sufficient capacity in terms of space and facilities to accommodate servicing and maintenance of the fleets deployed in the north of Scotland until 2029.

06 Potential investment programme

Through the Long Term Planning Process (LTPP) and ongoing dialogue with funders and stakeholders the rail industry has formulated and agreed investment options and choices for the network in Scotland. A number of options have also been proposed in England which will have benefits for cross-border services. The proposed options are summarised in this section. Further details of the options are available in the Scotland Route Study published in September 2016.

As part of Transport Scotland's Rail Infrastructure Strategy consultation the Scottish Government is proposing a flexible but robust process to govern the development, design and delivery of enhancement projects. A need to enhance the LTPP has been recognised, and much of the focus will be on integrating the LTPP with the agreed 'pipeline' approach to network enhancements. Going forward from 2019, a decision to commit to a specific enhancement project will be taken when the business case is clear and both cost and affordability are more certain. There will also be a requirement to confirm the availability of suitable capabilities and resources in rail industry supply chains required to deliver projects. Greater flexibility in the choice of development, design and contracting models to be applied to projects will also help to improve value for money and make best use of available industry resources.

This flexible, 'pipeline' approach would apply to all potential rail projects, including those being promoted by third parties, and the industry will continue to support promoters as they look to develop their proposals and produce associated business cases for consideration. Any proposed potential rail projects should be viewed within the context of a corridor enhancement and would also help inform choices and pipeline development. Given the funding challenges which exist for future projects and the likely constraints on future borrowing, together with pressure on existing Scottish Government budgets, there is a need for a clear prioritisation of investment options.

To facilitate this Transport Scotland have set out a tiered approach to new infrastructure investment, aligned with Strategic Transport Projects Review (STPR) hierarchy. Following the implementation of all reasonable service-based opportunities (e.g. changes to timetables, lengthening trains and/or revising stopping patterns), enhancement options could be grouped into the following four investment categories.

Transport Scotland categories for infrastructure investment

Category 1: Any enhancement projects that require to be carried over from the CP5 programme for completion in CP6.

Category 2: Enhancement projects considered essential to maintain a safe, high performing railway. Such projects, linked efficiently with planned renewals works, would be expected to provide increased capacity, improved journey times and/or improved performance at key locations where such outcomes are currently constrained.

Category 3: Enhancement projects to support social and economic objectives, including potential new routes, alignments and stations.

Category 4: Enhancement projects to increase capacity on key cross-border routes, with joint funding arrangements, and appropriate future-proofing for long term ambitions including integration with High Speed Rail.

Following on from the improvements listed in chapter 3, the following choices are proposed to accommodate forecast rail demand and also take into account a number of key issues that are likely to shape the way the railway in Scotland will develop in the coming years. These relate to: safety, performance, resilience, construction of High Speed 2 and the move towards a Digital Railway. Further details on these options can be found in Network Rail's Scotland Route Study published in July 2016 and RDG's 'Investing in the Future' published in September 2016.

Potential investment programme

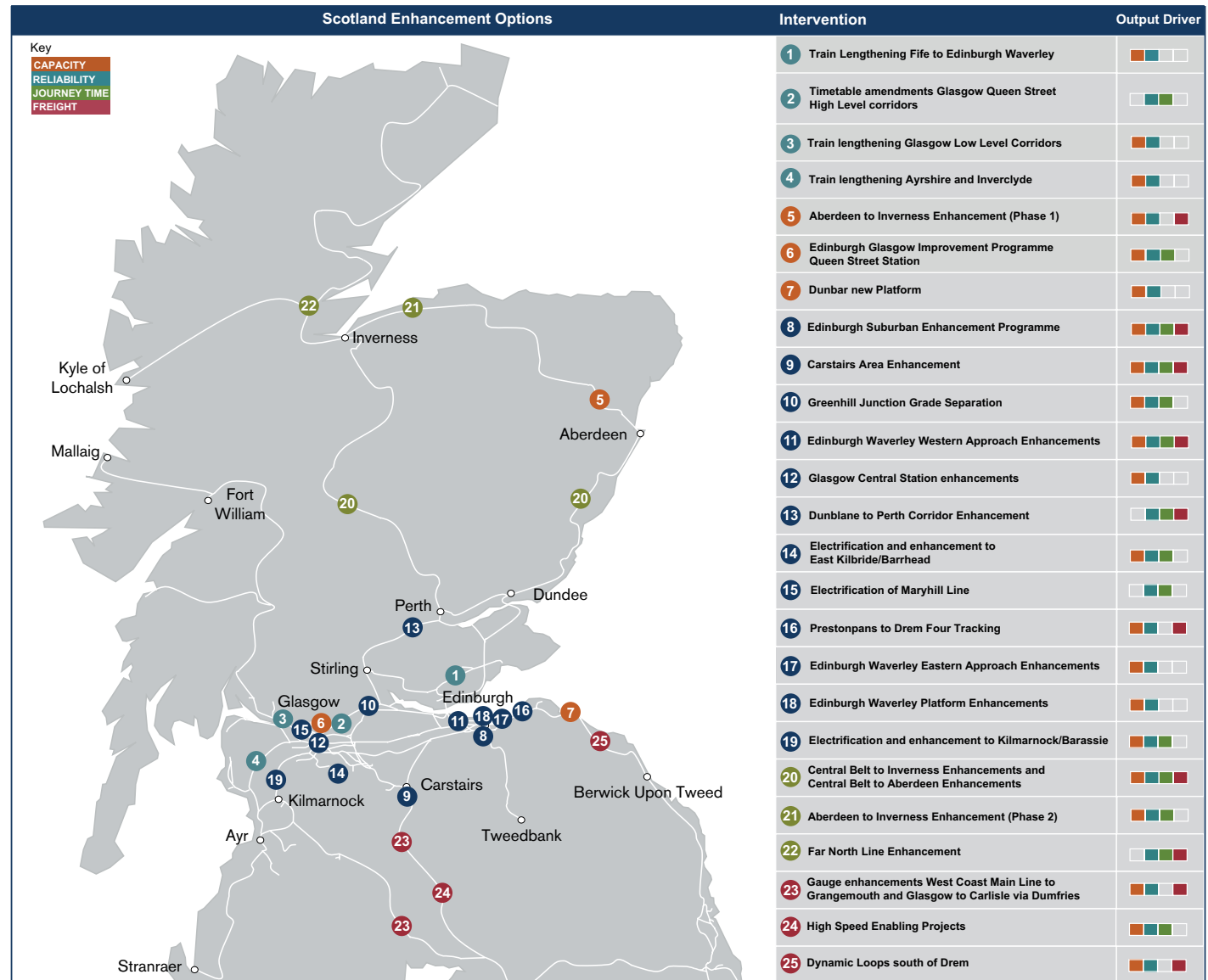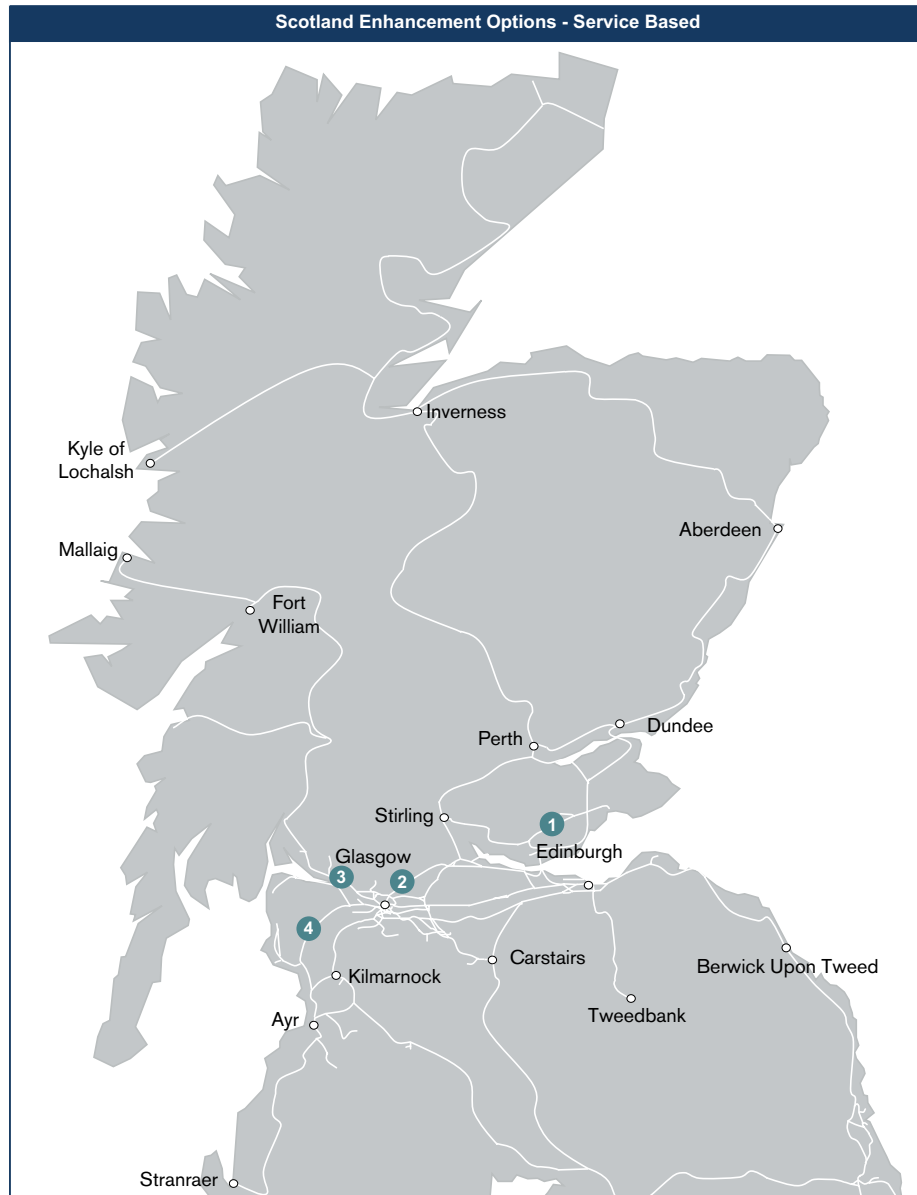**Figure 6.1 : Proposed Scotland enhancement options by category (see tables below)**

Potential investment programme

Scotland Enhancement Options - Service Based

Service-based options

Prior to undertaking large infrastructure enhancements a number of service-based opportunities have been identified to accommodate forecast passenger growth. These options support the Scottish Government's economic strategy by helping more people to access key employment areas and some are already being taken forward as part of the ScotRail 'Revolution in Rail' in December 2018.

Longer trains during peak times will accommodate more passengers and provide a better travel experience. It will also help to meet the ScotRail franchise commitment of no passenger standing for more than 10 minutes however not pursuing these options would result in a cost saving in rolling stock provision. Longer trains may also require infrastructure enhancements at certain stations to accommodate train lengths or selective door opening at some stations could also be considered. More crowding and longer standing during journeys will diminish customer satisfaction and could encourage passengers to use other means of transport.

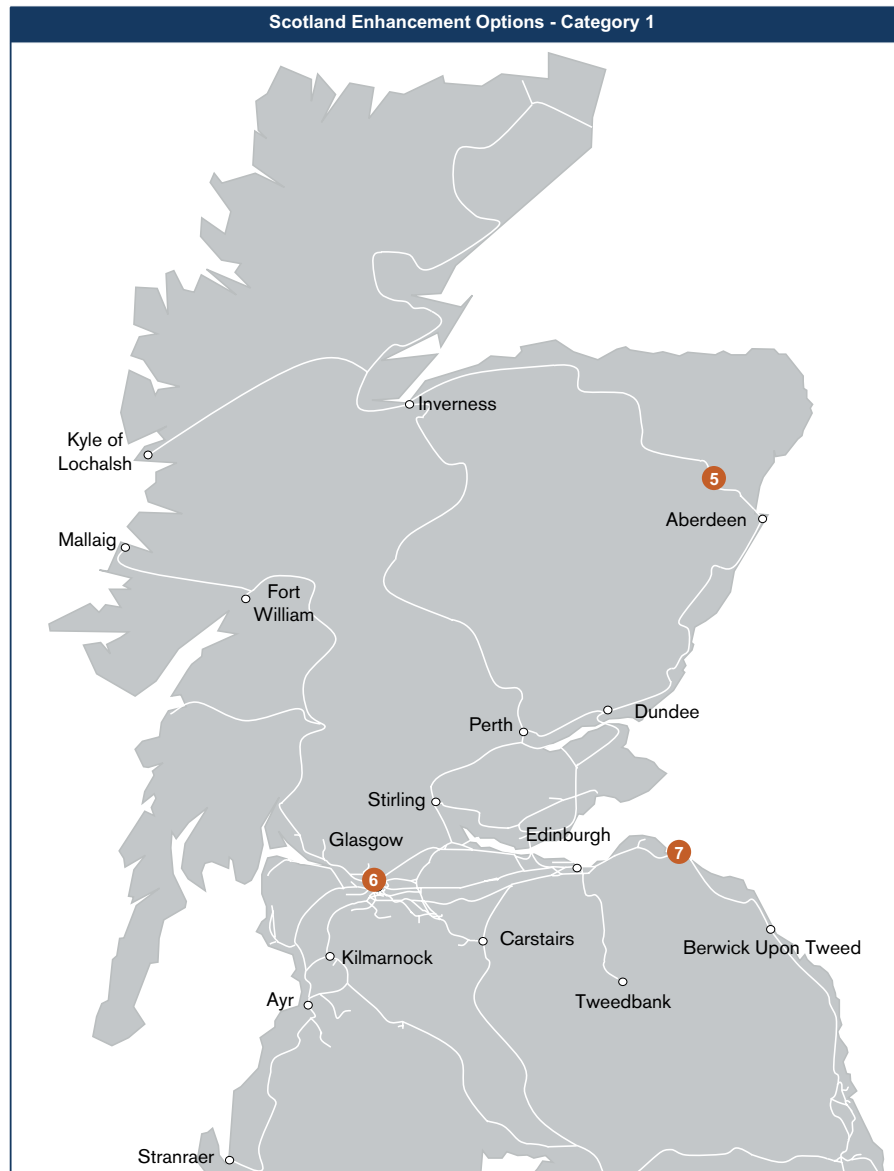| Ref	Intervention	Prioritisation assessment	Output Driver
1	**Train Lengthening Fife to Edinburgh Waverley** Providing more seats during peak hours to meet passenger demand	This option has been included in the ScotRail 'Revolution in Rail' for December 2018.	
2	**Timetable amendments Glasgow Queen Street High Level corridors** Better meet the needs of passengers across services by a combination of timetabling improvements and changes to stopping patterns.	This option has been included in the ScotRail 'Revolution in Rail' for December 2018.	
3	**Train lengthening Glasgow Low Level Corridors** Selective train lengthening on busy services provides more seats and eases crowding.	Option to lengthen some peak services by 2023 to meet forecast passenger demand.	
4	**Train lengthening Ayrshire and Inverclyde** Selective train lengthening on busy services provides more seats and eases crowding.	Option to lengthen some peak services by 2023 to meet forecast passenger demand	

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Category 1 - Enhancement projects continuing from CP5

Enhancement projects that require to be carried over from the CP5 programme for completion early in CP6.

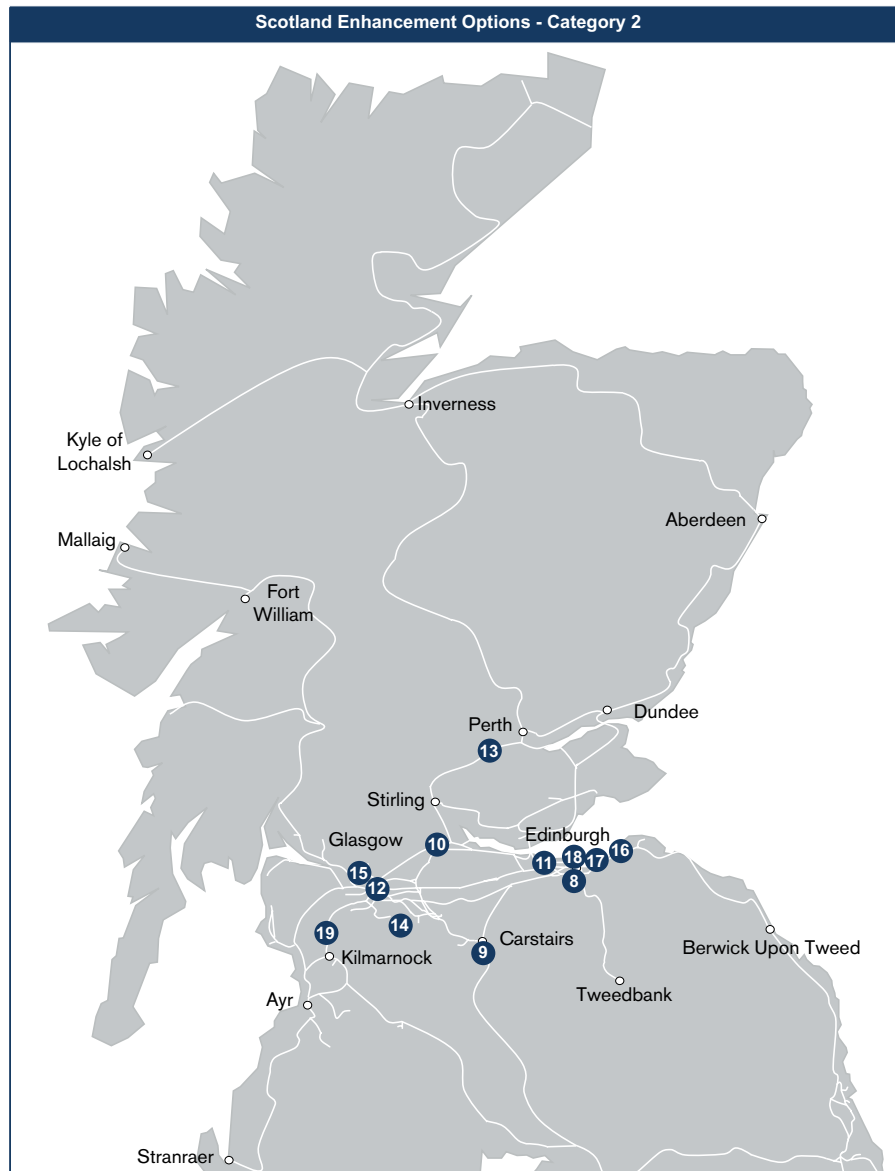| Ref	Intervention	Output Driver
5	**Aberdeen to Inverness Enhancement (Phase 1)** During CP5, the HLOS requires that the infrastructure capacity is provided for services at new stations at Dalcross and Kintore (subject to station promoter funding contributions), as well as introduction of more frequent commuter services on the Inverness - Elgin and Aberdeen – Inverurie sections of the route, with no detriment to existing end to end journey time. Implementation phased between 2017 - 2019 with a completion date of December 2019.	■■□■
6	**Edinburgh Glasgow Improvement Programme - Queen Street Station** This project will remodel Glasgow Queen Street station to lengthen platforms and enhance the station concourse. As a contingency it is possible that some project milestones may be delivered post March 2019.	■■■□
7	**Dunbar new Platform** This enhancement will relieve an existing constraint on the ECML due to the current single platform layout at the station. It will reduce journey times for services calling at Dunbar in the southern direction and improve performance on the ECML by avoiding conflicting train moves.	■■□□

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Scotland Enhancement Options - Category 2

Category 2 - Enhancement options to increase capacity and performance

The following enhancement options have been developed at key strategic locations on the Scotland network to provide increased capacity for forecast future passenger and freight growth. They also provide a means to improve rail performance by providing greater network reliability and flexibility. Enhancements have been linked to planned renewals to maximise value-for-money and minimise disruption to customers.

Prioritisation and scheduling of these options will be key to developing a pipeline which provides value to funders by enhancing the network in a way which minimises disruption to passengers and freight customers. The majority of these options also provide benefits for Category 3 social and economic benefits and Category 4 cross-border benefits.

Ref	Intervention	Prioritisation assessment	Output Driver
8	**Edinburgh Suburban Enhancement Programme** This option will build on infrastructure upgrades delivered by 2019, providing increased connectivity and resilience for passenger and freight services helping to improve performance across the central belt and cross-border. It will enable anticipated increases in freight demand to be accommodated and ensure that all freight can bypass Edinburgh Waverley providing greater capacity for passenger services. The option will tackle the capacity constraint at the key location of Portobello Junction and is linked to planned asset renewals at Niddrie South Junction.	This option could be undertaken early in CP6 capitalising on a number of CP5 schemes including W12 gauge enhancement from the ECML to Carstairs, electrification of the Grangemouth branch, electrification and new depot developments as part of EGIP and the electrification of the Shotts line. The consequences of not progressing with some elements of this scheme are significant, given the future dependence of Central Belt passenger services on the network to the east of Edinburgh.	■■■■
9	**Carstairs Area Enhancement** Improving the layout and line speed will improve performance, freight traffic regulation, reduce journey times and whole life costs. Extending platforms enables more seats on cross-border services.	Aligning this enhancement with planned asset renewals supports the efficient delivery of infrastructure upgrades by 2024 on the West Coast Main Line (WCML) corridor.	■■■■

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Category 2 continued

Ref	Intervention	Prioritisation assessment	Output Driver
10	**Greenhill Junction Grade Separation** Enhancing the infrastructure at this key location will provide a more flexible and better performing timetable which will improve journey times and enable more trains to operate. This option is also linked to planned asset renewals.	This option is proposed between 2019 and 2029 in order to build on CP5 enhancements and as a step towards connectivity and journey time aspirations on central belt to Aberdeen and Inverness corridors.	■ ■ ■ □
11	**Edinburgh Waverley Western Approach Enhancements** This option will enhance a key location in order to remove constraints in the Winchburgh/ Newbridge /Haymarket to Inverkeithing corridors to robustly accommodate forecast passenger and freight demand. The scheme will also help to avoid larger scale interventions closer to Edinburgh Waverley and may provide a route for larger gauge freight services.	This option is proposed to enhance connectivity for both local and interurban services from the north and west into Edinburgh by 2029.	■ ■ ■ ■
12	**Glasgow Central Station enhancements** Depending how other choices made by funders impact on station capacity, the industry will make best use of available capacity, consideration will be given to the rolling stock utilisation, timetable, infrastructure solutions and the following investment options • Extension and remodelling of existing platforms • Additional platforms (out with the current footprint) • Additional / re-modelled approach lines • Consideration of a new Glasgow City Centre Station. Pedestrian flow and retail/passenger facilities within Glasgow Central are also a key consideration	This option would be recommended by 2024 as forecast demand by that date indicates that shorter platforms at Glasgow Central High Level will no longer be fit for purpose as they will be too short to accommodate modern rolling stock. Enhancements could contribute to improvements on a number of corridors including the WCML, Glasgow suburban and southern Scotland routes.	■ ■ □ □
13	**Dunblane to Perth Corridor Enhancement** This enhancement supports journey time reductions, additional services, network flexibility and performance benefits for passengers and freight customers. Linking the projects with asset renewals and prioritising the upgrades at the right location and time will maximise the benefits of the enhancement to the industry and funders. Early priorities include: • Perth station re-modelling to provide improved transport interchange capabilities and passenger experience. Infrastructure redevelopment and re-signalling prior to electrification, including freight looping capacity, • Perth Servicing and Stabling facility	This option is proposed to enhance the network prior to electrification to minimise disruption to customers and provide better value for money. This proposal builds on the "Rolling Programme of Electrification" to 2019 and contributes to enhancements on the central belt to Aberdeen and Inverness corridors.	□ ■ ■ ■

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Category 2 continued

Ref	Intervention	Prioritisation assessment	Output Driver
14	**Electrification and enhancement to East Kilbride/Barrhead** Providing additional infrastructure – potentially including electrification - more seats to meet forecast passenger growth as well as minimising the platform capacity required at Glasgow Central.	Passenger demand forecasting indicates that this option should be considered by 2024. To minimise costs and disruption to passengers enhancing the infrastructure in advance of electrification is advisable. Signalling and track enhancements could deliver an increase in the number of trains and reduced capacity requirements in Glasgow Central prior to electrification. Due to the different rolling stock performance characteristics between diesel trains and electric trains further infrastructure alterations may be required. It should be noted that the introduction of electrified services alone would not provide an increase in seating capacity.	🟧🟦🟩⬜
15	**Electrification of Maryhill Line** This option enables the construction of an efficient timetable to optimise platform occupancy, improved rolling stock utilisation and provides resilient network performance.	This is a funder aspiration as part of the Strategic Transport Projects Review Rolling Programme of Electrification.	⬜🟦🟩⬜
16	**Prestonpans to Drem Four Tracking** Combined with a timetable change, this option contributes towards additional local services providing more seats at busy times, increases local connectivity and performance. It is also a step towards more cross-border passenger and freight services longer term.	This scheme could be delivered by 2029 as the first of several East Coast Main Line (ECML) corridor interventions required to achieve longer term capacity, journey time and connectivity aspirations. Early development of this option is recommended in order to undertake the lengthy building permissions process.	🟧🟦⬜🟥
17	**Edinburgh Waverley Eastern Approach Enhancements** This option will maximise platform capacity and availability at a congested part of the network improving performance at a key location as part of ECML corridor enhancements. It is also linked to signalling and track renewals around the station.	Due to the potentially disruptive nature of this option it is proposed to be delivered 2024-2029 after the Edinburgh Suburban Enhancements Programme, in order that ECML services can be re-routed via Haymarket while eastern approach enhancements are undertaken.	🟧🟦⬜⬜
18	**Edinburgh Waverley Platform Enhancements** Extending platforms enables more station capacity giving more flexibility and better performance for both local and cross-border services at Waverley.	This scheme is proposed to meet forecast passenger demand by 2024 and as part of ECML corridor enhancements.	🟧🟦⬜⬜
19	**Electrification and enhancement to Kilmarnock/Barassie** Making best use of the available capacity and providing a more resilient network delivering greater connectivity and performance.	This option is linked with and would follow on from enhancing and electrifying to East Kilbride and Barrhead and would therefore be proposed by 2029.	🟧🟦🟩⬜

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Scotland Enhancement Options - Category 3

Category 3 – Enhancement options supporting social and economic objectives

The following enhancement options support the Scottish Government's social and economic objectives by providing greater connectivity and improved journey times to communities around Scotland.

In proposing potential new routes and stations there will be opportunities for promoters and stakeholders to work with the Scottish Government and the rail industry to develop options going forward. Should any of these proposals be progressed in the future the industry will work with the promoters involved to integrate them into the existing rail network.

The options identified here relate to the current rail network as it is inappropriate for an industry-led process to determine the appropriate delivery of transport requirements.

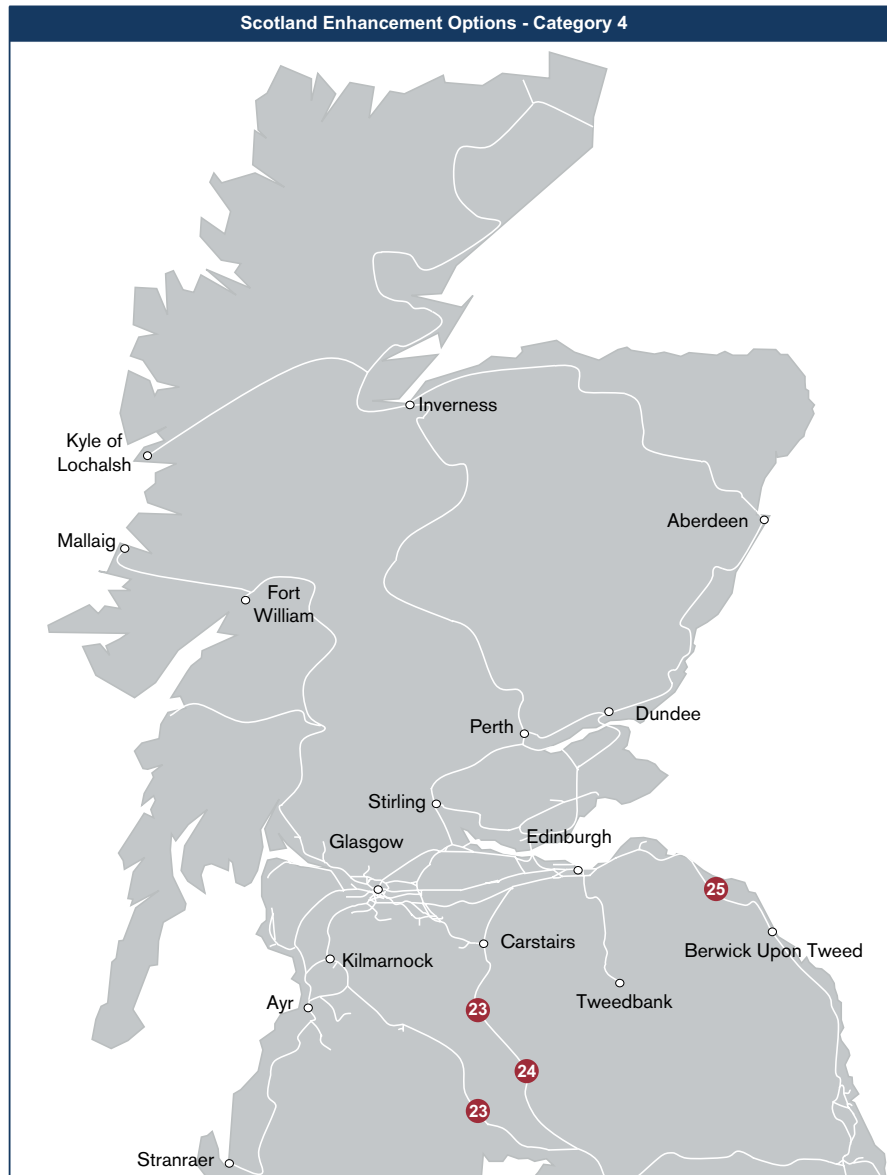| Ref	Intervention	Prioritisation assessment	Output Driver
20	**Central Belt to Inverness and Central Belt to Aberdeen Enhancements** Delivering incremental infrastructure enhancements in a logical manner will help the industry deliver benefits as early as possible on these corridors. In some instances infrastructure interventions that are undertaken at different locations along a line of route can provide the same outputs in terms of end to end journey time improvements, connectivity and enhanced freight operation. Focusing on the outputs and not constraining funding to geographic areas is important for delivering efficient projects that provide the maximum benefits to passengers and freight customers.	These corridor options comprise of a number of enhancement opportunities which could be implemented over several control periods.	■■■■
21	**Aberdeen to Inverness Enhancement (Phase 2)** Building on the infrastructure and passenger service enhancements that will be delivered in 2019. Further enhancement of overall passenger services and capability whilst reducing journey times and improving reliability.	Hourly opportunities to travel between Aberdeen and Inverness to meet forecast interurban demand by 2024. Half-hourly opportunity to travel between Inverness and Elgin if sufficient demand exists following the introduction of an hourly service in December 2019	■■■□
22	**Far North Line Enhancement** Providing a reliable timetable, better performance and infrastructure for passenger and freight services is of prime importance on this route which provides "lifeline" services to the local communities.	This option is a funder aspiration.	□■■■

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Scotland Enhancement Options - Category 4

Category 4 - Enhancements options on cross-border routes

The following enhancement options relate to projects which will increase capacity and performance on cross-border routes with joint funding arrangements. These options also take cognisance of long-term rail aspirations and include the integration of High Speed Rail. Whilst these options are primarily cross-border focused they also relate to Category 2 which aims to increase capacity and improve journey times on the Scottish network.

Ref	Intervention	Prioritisation assessment	Output Driver
23	**Gauge enhancements West Coast Main Line to Grangemouth and Glasgow to Carlisle via Dumfries** Gauge enhancement on the WCML to Grangemouth will support the freight industry to better meet demand and potentially open up new markets. Upgrading gauge on key alternative routes into Scotland such as the Glasgow and South Western line(via Dumfries) will improve railway resilience by enabling trains to be diverted during disruption.	WCML gauge enhancement is proposed to increase freight efficiency by the end of CP6 and contribute to WCML corridor enhancement. These options increase the resilience of the strategic freight network by providing diversionary routes of sufficient capability to run more trains when network capacity is reduced due to planned or unplanned disruption.	
24	**High Speed Enabling Projects** Provide funding to undertake development work to determine how High Speed 2 (HS2) and High Speed Rail Scotland (HSRS) can be efficiently integrated into the existing rail network in Scotland.	Feasibility and development works should be undertaken during CP6 to allow sufficient time for successful delivery of enabling works in advance of the introduction of high speed services.	
25	**Dynamic Loops south of Drem** A further opportunity exists to provide more capacity and operational flexibility for both local and long-distance passenger trains as well as freight.	This option is proposed to be delivered after the Prestonpans to Drem Four Tracking to optimise the benefits of phasing ECML corridor enhancements.	

KEY

CAPACITY	RELIABILITY	JOURNEY TIME	FREIGHT

Potential investment programme

Investment to improve links between Scotland, the North, Midlands and London

In addition to Category 4 enhancement options a number of schemes have been proposed in England to enhance capacity and journey times which will improve cross-border connectivity, particularly related to developments in HS2.

Connectivity between Scotland, the North, Midlands and London is today provided primarily by two electrified, high speed routes: the ECML and the WCML, which run along the eastern and western sides of the country respectively. Both routes carry north-south Long Distance High Speed (LDHS) flows, and form a vital part of the wider cross-country network. They also convey heavy tonnages of freight traffic to terminals in the Central Belt of Scotland and, approaching Glasgow Central and Edinburgh Waverley, handle a complex range of regional commuter and high frequency local passenger services.

Both routes have a number of capacity constraints, reflecting their mixed traffic nature. Over the next five years, significant enhancements in the capability of the rail network will be completed on the ECML and on the WCML in England. Further options to increase capacity (e.g. train lengthening) are limited and only likely to meet demand until approximately the mid-2020s. Beyond this date the southern sections of the Anglo Scottish routes require a step change in capacity provision, which is to be delivered through HS2.

HS2 represents a significant uplift in capacity and connectivity from London to the Midlands and the north, with Phase 1 between London, Birmingham and Handsacre (near Lichfield) to be opened in 2026. Without HS2, the WCML will be unable to meet the demands placed on it by passengers, freight or the economy. HS2 services between Glasgow and London are planned from 2027, and between Edinburgh and London by 2033.

HS2 will accommodate a step change in capability for Anglo Scottish routes, but its outputs and time scales are still in development. For the Scotland Route Study (published in July 2016), it was assumed that HS2 services will run via WCML routes for Glasgow/Edinburgh to London passengers, as per the current published HS2 business case, and a complementary assessment of constraints on Anglo Scottish routes is now being undertaken, for sections north of the proposed new HS2 infrastructure.

The main focus is on identifying which on-infrastructure works should be undertaken by 2028/29 (linking with planned asset renewals where possible)

as enabling works for HS2, to reduce bottlenecks on the network and improve timetable resilience. This approach will also produce a phased programme of future enhancement options to reduce journey times between London and Glasgow / Edinburgh down towards 3 hours, work is beginning from 2029 onwards.

HS2 enabling works in Scotland will follow on from renewals and enhancements on the WCML, including Motherwell area re-signalling and Rutherglen Junctions re-modelling due for completion by 2019. Future proposals for CP6/7 will include options such as Carstairs Junctions remodelling and the improvements to traffic flows into the Edinburgh Waverley Western Enhancement (which would improve opportunities for WCML trains to run through the Haymarket area).

A number of interventions are proposed in England as complementary to HS2, to accommodate the post-HS2 timetable, or to enable the full benefits of HS2 to be realised. Although HS2 will relieve capacity constraints on the southern ECML and WCML, issues will remain at the northern ends of both routes in England. Further details on proposed interventions on the ECML in England – including consideration of digital solutions – will emerge in the East Coast Route Study which will be published for consultation in spring 2017. The interventions choices and options put forward in the route studies for Scotland, the North, Midlands and London are available here.

07 Funding Strategy

Current context

In the current control period, Scottish Ministers provided funding for a number of specified projects, as well as five ring-fenced funds. These funds have generally worked well, and are delivering schemes with strong business cases. They are:

- Scottish Stations Fund

- Scottish Strategic Rail Freight Investment Fund

- Scottish Network Improvement Fund

- Future Network Development Fund

- Scotland: Level Crossing Fund.

At the same time, investments such as Highland Main Line Phase 2, Aberdeen to Inverness Phase 1 and EGIP have been funded as "named" determination schemes, where the outputs have been defined by Transport Scotland, and where the business case is owned by Scottish Ministers.

The approach that funders choose to take to funding enhancements is principally a matter for them. However, the approach taken to funding enhancements to the network can have a material impact on the type of schemes that are delivered. Developing a sound funding framework, that takes account of how projects are developed, will be fundamental in delivering both strategic and tactical improvements to the network.

Understanding the implications of an evolving industry and funding structure

The long-term future of the railway depends on its ability to respond to the challenges it faces in the markets that it serves. In some markets this will mean challenging for increased market share; in others, it may mean accepting that rail may not be the mode that is best placed to meet the needs of the market or funders.

Responding to these challenges will require the industry to act in a co-ordinated and consistent way. The ScotRail Alliance is an important step forward in this regard, and is central to how the railway should develop in Scotland.

However, the multi-operator nature of some of the busiest parts of the Scottish rail network means that there are – and have to be – clear boundaries within which the ScotRail Alliance operates. Network Rail is required through its Operating Licence to apply a policy of not unduly discriminating between operators or funders in terms of either its long-term planning or its allocation of track access rights.

The Shaw Review of Network Rail highlighted the potential benefits of further devolved decision making and accountability, with a strong System Operator to provide strategic coordination and leadership. Ensuring that Scotland's railway is fully integrated with the development of major improvement programmes in anticipation of HS2 is a key responsibility of the System Operator.

Scotland's Ministers are already responsible for funding and specifying the Scottish network, which is reflected in Network Rail's regulated outputs and incentives. With the creation of the ScotRail Alliance, most rail outputs are delivered through it. Cross-border passenger, sleeper and freight operators are not part of the Alliance, but are working closely with Network Rail to deliver improved services for their customers.

A strong and effective System Operator will integrate strategic planning and cross-industry priorities effectively, allocating capacity fairly and transparently across all operators. Working closely with Network Rail's Scotland Route, funders, operators and wider stakeholders to promote a long-term focus, it will be able to support both efficient delivery of current and future investment, and further devolution, across the network. It is an essential building block enabling the industry to develop and take forward future choices that deliver for Scotland.

Balancing discretion and direction

The regulatory context within which Network Rail has delivered enhancements is and will continue to be output-based. However, striking an appropriate balance between direction and discretion in how these outputs are delivered is a key issue, and will need serious consideration and discussion. The funding approach that the Scottish Government decides upon will have to reflect an environment where it is not necessarily the only funder of the railway in Scotland.

There will need to be a balance between discretion and funder direction, and there are risks attached to having the wrong balance. Where the funding settlement relies too much on funder direction, the more removed the industry is likely to become from supporting the delivery of outcomes. Ensuring that the future approach to funding includes both meaningful incentives for the industry to respond to and appropriate levels of accountability will be essential.

Funding Strategy

Understanding the implications of a multi-funder environment

In parallel to the structural changes that have taken place in Scotland following the creation of the ScotRail Alliance, the funding environment in Scotland is also becoming more complex. Investment funds from the Scottish Government may become more limited in the future, and the industry will need to be able to identify and co-ordinate funding streams.

This reflects both scheme-specific funding arrangements as well as changes resulting from political devolution such as the City Deal programme. Responding to this emerging environment will be important in the future, both in the context of adhering to the principles enshrined within the Network Code but also in how business cases can best be developed for multi-funder schemes.

As discussed above, under the terms of the Network Code, Network Rail is not permitted to 'unduly discriminate' between bodies that fund the network. In a multi-funder environment, this may present challenges where funders have competing objectives and different criteria for project development; it also provides an opportunity for the industry to act as an informed partner and advisor to the bodies that fund it, in particular where it is the guardian (though not the owner) of major scheme business cases.

It has specific implications for the way enhancement schemes are appraised. Scheme appraisal within the rail industry has mainly focused on assessing options to inform how an enhancement output should be delivered most efficiently. This is appropriate for a single-funder approach to planning enhancements, as it is for the funder to decide if the enhancement is an efficient way of meeting the funder's broader policy objectives. In a multi-funder environment, where smaller funders are not as well-resourced to develop the wider business case for schemes as the Scottish Government is, the role of the industry in taking forward development will be critical.

The process of developing, appraising and prioritising investments will need to be progressed further to include the wider impact of rail on the economy and society. Evolving methodologies for assessing these impacts will be a key challenge for government, the rail industry and for funders.

Understanding how the railway can play its parts as a credible and trusted partner

Underpinning the industry's view of the future is the view that it should provide leadership in those areas of activity that it is best placed to manage. As the industry and its funding structure changes, the scope of industry responsibility will need to adapt accordingly.

This leadership may include challenging rail stakeholders on occasion where there are conflicts between the achievement of short-term and long-term objectives, or where there is a lack of clarity on the part of funders and stakeholders about what their ultimate objectives are.

However, in order to be viewed as a credible and trusted adviser, the rail industry needs to deliver its current promises and to demonstrate its ability to respond to changing requirements and priorities. The industry must improve its ability to maintain the network's resilience in the face of increasing demands and external challenges such as climate change and on its ability to deliver outputs as agreed and funded.

Secondly, the industry must learn lessons from the current enhancements delivery programme, both in terms of project delivery and in terms of the early stage development phase of projects where risks can be identified and mitigated.

Industry planning

The industry has demonstrated its appetite and capability for identifying long-term challenges for the railway and developing appropriate responses to it. It works closely with stakeholders across Scotland and is well placed to support and advise both the Scottish Government and new investors in the railway. The rail industry is well placed to become an informed partner that manages business cases that have more than one owner and that safeguard the interests of all parties in an open and transparent way.

The industry has also demonstrated that it is capable of managing the funds that are devolved to it in an accountable and efficient way. We would encourage the Scottish Government to ensure that whatever funding approach it adopts is consistent with delivering tangible benefits to passengers, freight customers and wider Scottish society.

Commercial sources of income

Public funding sources and farebox income will always be the main sources of industry funding. It is important that the industry retains the freedom – within certain parameters – to take advantage of commercial opportunities which enable the future growth of the network. This will minimise the industry's call on public funds and passenger fares. Where it is possible to optimise the performance of land and property assets, this commercial approach will go hand in hand with improving customer satisfaction.

Funding Strategy

In addition, a source of funding for early engagement in the pipeline of proposed enhancements where land may be required would also benefit the long term planning for Scotland's Railway.

Consultation on Scotland's Rail Infrastructure Strategy

Question 4

'4. What are your views on the retention or removal of individual ring-fenced funds?'

The industry recognises the role that ring fenced funds have played in delivering improvements to the Scottish network in CP4 and CP5. They ensure that the investment funding the Scottish Government provided to Network Rail is used to deliver outputs that the Scottish Government values and not just those outputs where Network Rail has specific regulatory or financial incentives. They also increase the flexibility available to the industry, providing it with sufficient discretion to take forward investments and interventions that deliver benefits.

Overall, the package of Ring Fenced Funds developed for the current control period – and the guidance structure within which they have operated - has worked well. However, the Scottish Government has an opportunity to consider how it wishes the arrangements to continue most effectively.

In particular, the industry considers that a trade-off needs to be made between a larger number of relatively low-value and tightly-targeted funds and a smaller number of funds potentially larger in scope. Transparent and effective governance arrangements, in the context of the MoU and the wider development pipeline, are likely to be able drive better value for money, especially when aligned with choices on train service outputs. Given the challenges the industry faces, there is a potential opportunity (on the basis of business cases) to develop integrated schemes for routes that cut across the boundaries of the current funds available.

However, where the objectives of Ring Fenced Funds are clear, and where the guidance supporting them is clearly understood, they are an effective mechanism for translating Scottish Government policy into action. Their inherent challenges need to be accepted and sufficient flexibility built in to ensure that they support Ministers' vision, are transparent and have clear governance integrated with the wider planning process.

The ring fenced funds have enabled the industry to work collaboratively with other funders to enhance the railway in Scotland. It is the industry's view that enhancements funding should be packaged in a way that is consistent with the way that benefits are likely to be derived. So, where enhancements are strategic in nature and are intended to deliver specific social and economic impacts over the longer term, a pipeline funding approach is likely to be more appropriate.

Where, however, smaller scale, tactical enhancements are likely to provide value-for-money, ring fenced funds are an appropriate way of balancing accountability with efficient delivery. The Scottish Government's policy in regard to ring fenced funds should therefore focus on developing a package of ring fenced funds that compliments its view of the enhancements pipeline and that reflects its broader policy priorities, while avoiding the creation of artificial barriers to efficient investment.

Scottish Station Fund

The Scottish Station Fund (SSF) will deliver a number of new and improved stations during the current funding period. The projects delivered through it range from the delivery of additional car parking spaces at some of our key stations to the proposed opening of new stations, for instance at Robroyston, Kintore and Dalcross.

However, meeting stakeholder expectations has been challenging for both the industry and for the Scottish Government. The aspiration for new stations reflects how successful many station openings have been, and how highly rail services are valued by our communities. The desire to share in the success of the railway is therefore understandable.

The industry advice is that any successor to the SSF will require clear guidance, and clear success criteria for scheme promoters to follow (for instance, inclusion in local development plans and regional transport strategies). This will ensure that schemes to develop new stations are deliverable and take into account broader impacts on service delivery and on network performance.

A future station fund could focus on ensuring that existing stations capitalise on opportunities to extend the reach of the railway by focusing on integration. New station proposals could be supported where they are consistent with the vision that funders have for particular transport corridors.

There should also be a consideration as to whether this fund could also review 'Access For All' requirements across the network. Currently, Access For All is not a devolved matter in Scotland, and is managed through the DfT. Should access for all not be devolved to Scotland, the railway would seek to secure an allocation of funding from DfT.

Funding Strategy

All aspirations and continued opportunities to invest would require a much larger fund in CP6 than the £30m determined for CP5, and a mechanism of securing third party investment in the rail network to maximise affordability if the SSF is to be carried forward in to the next funding period.

Scottish Strategic Rail Freight Investment Fund

The introduction of a freight fund in Scotland provided a more targeted focus on improving access to the network for freight customers and freight shippers. Providing business cases consistent with the agreed governance has been challenging due to the inherent uncertainty of many freight markets.

Benefits have generally been maximised where freight-specific funding has been combined with other funding sources (in particular, the Scottish Network Improvement Fund). The mixed traffic nature of the network in Scotland means that it is difficult to separate freight-specific impacts from passenger-related benefits. Any future freight-specific fund is likely to operate in a similar way.

However, the Scottish Strategic Freight Investment Fund has ensured that the needs of the rail freight market are appropriately considered at the development stage of projects, and the industry views this as having been highly beneficial at a time when the freight industry is undergoing significant structural change.

The main priority of the freight industry is to enhance the SSFN routes to support future growth opportunities. The SSFN is a mixed-use network, and – in places – a capacity constrained railway. Opportunities to secure further rail freight growth on the SSFN corridors are likely require tactical as well as strategic interventions to support the needs of the Scottish economy. The industry view is that a freight-specific fund could be an appropriate vehicle for delivering these types of scheme if it can be specified correctly. Examples of the type of schemes that could be supported through such a fund include:

- WCML to Grangemouth W12 Gauge enhancement
- Diversionary Route Capability
- WCML capacity enhancements
- Capacity enhancements between the Central Belt and Aberdeen
- Capacity and gauge enhancements between the Central Belt and Inverness
- Railhead and Terminal connectivity & capability
- Improvement & Development Fund

The Scottish Network Improvement Fund and Future Network Development Fund have been used to plan enhancements on the back of planned renewals and support the pipeline of schemes being developed beyond CP5. Linking enhancements with asset renewals can deliver significant efficiencies, and the ability to draw down on funds available during the next control period to take advantage of opportunities should be maintained.

During CP5 successful projects have been delivered through the Improvement Fund in this way. Resignalling projects on the Inverclyde line have enabled better flexibility for stabling at Gourock station in addition to improved capability to Greenock station in times of disruption. The Anniesland Chord connection was linked to the EGIP programme of work to enable access to Queen Street station for electrification, while additional capacity on the Midcalder to Holytown line was linked with electrification and resignalling. All of these projects demonstrate the value in retaining this fund or having access to future funding.

Developing projects to enable a pipeline of projects to continue beyond CP6 is also key and a funding stream will be crucial.

Level Crossings closure fund

Level crossings still offer the biggest catastrophic risk on the railway in Scotland, with closure being the best form of risk control. Although success has been achieved in Scotland the process is complex and protracted therefore a closure funding solution needs to developed covering 5, 10 and 15 years especially for locations where significant civil engineering work needs to be completed to deliver a closure.

The level crossing fund has - and will - deliver safety benefits through the planned closure of high risk crossings in Scotland during this funding period. For instance, St Ninians crossing is planned for closure in this funding period.

A fund which continues to enable a reduction in level crossings on the network could be part of a future funding settlement, but should also be large enough to take congnisance of the complexities closing some level crossings face through road changes or land requirements. Closing some level crossings will also enable line speed improvements on the rail network in addition to the safety benefit and these will be explored and developed further to bring forward a pipeline of closure opportunities.

Funding Strategy

Consultation on Scotland's Rail Infrastructure Strategy

Question 5

'5. What alternative sources of funding could be used to help deliver the rail investment programme?'

The rail industry at a GB level is prioritising the development of sources of third party funding to continue improving the railway for passengers and freight users. The industry in Scotland will work with the Scottish Government in developing opportunities that reflect Scotland's priorities and context.

Building on the links that already exist with local authorities and wider stakeholders would permit the industry to integrate with funding streams such as City Deals and Section 75 contributions (or its potential successor). These links have yielded significant third party contributions to support the proposed station openings at Robroyston and Kintore. They can also ensure that transport is integrated within wider spatial development strategies ensuring that these strategies deliver best overall value-for-money.

The scope for attracting third party funding in Scotland is likely to be different than it is in other parts of Great Britain. The market for passenger travel in Scotland is far less focused on rail than it is in South East England, for example, the value that can be extracted from developers is likely to be correspondingly lower. Likewise, leveraging third party funding in Scotland may also require some financial and strategic priorities defined by the Scottish Government if the opportunities that exist are to be fully realised.

An important requirement in relation to third party funding is having clarity of purpose and clear industry objectives. The railway in Scotland exists to support the Scottish Government to meet its wider economic, environmental and social objectives. Third party funding of the railway in Scotland has to be consistent with these objectives if it is going to deliver significant benefits to rail users and to its principal funder.

Third party funding needs to be integrated with wider strategic planning, to maximise the economic value of the railway. Schemes need to be developed that do not simply pass costs on to other funders (potentially in the form of lost revenue or bringing forward enhancement schemes) or to rail users (in terms of increased fares, poor performance or overcrowded trains), and which are consistent with the overall direction of Government strategy.

The System Operator will be able to support the over arching interests of the Scottish Government (as set out in its appraisal guidance and stated policies) on an independent basis to ensure that third party funding of the railway in Scotland is consistent with these wider policies. Likewise, the System Operator will need to ensure that third party investments are not subject to undue discrimination from the principal funder in Scotland.

Third party funding

Constraints on the future funding of the railway in Scotland will affect the industry's ability to support the Scottish Government's social and economic objectives. Broadening the scope of funding for the railway in Scotland will require industry to seek alternative sources of funding beyond those which it has become accustomed to in recent decades. This is particularly relevant where infrastructure enhancements are concerned, but it also applies to service provision.

In England and Wales Sir Peter Hendy, Network Rail Chairman, has emphasised that securing significant, third party funding will be one of the main factors that will help to prioritise projects for delivery. Ultimately, for any investment south of the border, that will remain a matter for the UK Government. In Scotland, the industry does not believe including such a strict requirement in the decision-making criteria will be possible if the industry is to play its part in supporting Scottish Government objectives, so opportunities to leverage third party funding will need to be considered on a case-by-case basis.

It may be the case that in order for such opportunities to be realised, the railway will require public funds to leverage third party contributions, and the industry would advise the Scottish Government to consider this when making its funding decision, potentially by allowing for it in its decisions about the level of borrowing headroom that it makes available to Network Rail.

However, the Scottish Government also need to consider how it specifies service enhancements if third party funding is to be realised, and consider how this funding could support train operations in addition to infrastructure enhancements. For example, the enhancements to the Shotts corridor will permit the operation of a more frequent service than is currently specified in the ScotRail contract. Future additional services could be supportd by a contribution from third parties such as the local authorities along the route that potentially benefit from additional new housing development-related Council Tax receipts.

Considerations such as development gain, and the potential planning reform should therefore form part of the commercial case for delivering corridor enhancements as part of the enhancements pipeline. Likewise, where the network in Scotland forms part of the constraints facing the railway in England and Wales, the Scottish Government could potentially seek funding from funders outside Scotland as is being considered for the Carstairs Remodelling project. The key to achieving this will be to work with the System Operator to analyse the range of opportunities that are likely to present themselves and to understand the market that exists in England for enhancements north of the border.

08

What would a 'good' settlement look like?

Purpose of the Chapter

The industry in Scotland is supportive of the Scottish Government's Rail Infrastructure Strategy. It is well aligned with the thinking already underway within the industry, and develops several new ideas that the industry would like to take forward in partnership with the Scottish Government. Engaging with both the Scottish Government and the Office of Rail and Road is a priority over the coming months as the PR18 Periodic Review progresses.

The primary purpose of any regulatory settlement is ensure that the framework for the industry is effective, allocates risk and reward appropriately, and is transparent in its operation. This is true of all reviews; it is particularly true of this periodic review. What is important, therefore, is that the agreed framework is sufficiently robust to allow for flexibility and evolutionary change.

A particularly important issue in CP6 will be the need to balance the short-term risks around financing the railway on a largely 'pay as you go' basis, and the longer term challenges of ensuring the future sustainability of the network. In this respect, it is inevitable that different parties will have differing views of what "good" looks like. This chapter is therefore intended to support the industry's advice on its priorities and how they could be included in an effective specification of rail infrastructure priorities beyond 2019.

Defining "Good"

The period between now and the publication of the HLOS is an opportunity for the Scottish Government to build on its various strategies (including its Economic Strategy, Transport Scotland's Rail Freight Strategy and this Rail Infrastructure Strategy) to provide the clarity required to support a successful industry strategy.

The railway in Scotland has been in existence for nearly 200 years. During this time it has experienced periods of both rapid expansion and retrenchment. It is currently in a period of expansion, which has been driven by social and economic trends, and this growth has been supported by policy.

A "good" settlement for the industry in Scotland will therefore be one that incentivises the industry, its principal funder and its regulator to improve the collective understanding of what the key drivers of a successful railway are and how they can be accommodated affordability and effectively.

It will allow the railway in Scotland to deliver Ministers' priorities for domestic outcomes, whilst remaining part of the wider network in Great Britain. It will take account of the different geographies and markets that the railway serves in Scotland. This will be particularly relevant in delivering optimal asset policies and funding to ensure that the network is maintained and renewed sustainably.

It will address incentive issues within the industry, by focusing the industry on the outcomes it delivers for Scotland. At an industry level, this will require a central focus to be on how passenger and freight shippers experience the railway.

It will need to recognise that, although the majority of passenger services within Scotland are operated by ScotRail, the value generated by cross-border passenger and freight operations both to the railway and to Scotland's future are fully taken into account, and that effective provision is made to ensure that the benefits of High Speed Rail are integrated into industry planning and outputs.

It will balance risks between funders, operators, Network Rail and end users in a way that incentivises decision makers to develop and prioritise investment in the areas that will generate the highest economic and social returns, and will incentivise both the industry and funders to understand which elements of connectivity are most relevant in different markets when planning investment on the railway.

It needs to be sufficiently flexible to take account of the fact that industry decisions and strategies, for example the development of the enhancements pipeline and the procurement of franchised services, are not perfectly aligned to the regulatory cycle.

It will take account of a funding environment which is more constrained than has hitherto been the case. It will recognise that the System Operator element of Network Rail will need to be appropriately resourced if the process of devolution within Network Rail in Scotland – and in particular the operation of the ScotRail Alliance – is to bed down effectively. It will take account of the changing political environment within Scotland (post-Smith Commission) which will inevitably require a more integrated approach to economic and transport planning.

What would a 'good' settlement look like?

Implications

Achieving all these objectives will be challenging for all parties and a balance will need to be struck by the Scottish Government, the industry and its regulator to ensure that there is clarity as to the key decisions that will have to be made over the next 18 months. Ensuring that all parties are clear as to key outcomes and strategies is central to ensuring that informed trade-offs can be made, and support the ORR making its judgements on safety and efficiency on the basis of the best available evidence.

The development of a meaningful suite of outputs in both the HLOS and in the ORR's subsequent determination is the most obvious manifestation of the clarity that the industry requires. Outputs need to be consistent with government's overall transport policies and objectives and – perhaps even more importantly – need to be clearly aligned to the Scottish Government's wider social and economic policies. Mis-specified outputs can inadvertently lead the industry along paths that are difficult and expensive to recover from.

Finally, it is clear that the funding available over the next five years will inevitably be constrained while the demands on the railway are likely to increase further. Managing these competing demands will require the industry to work with its funders in a creative, constructive way. The PR18 Periodic Review should be supportive of this type of environment rather than being an obstacle to it, and ensure that the short-term incentives of all parties do not obscure the Scottish Government's longer term objectives for the industry

09 Next Steps

The advice contained within this document represents the industry's view of the strategic choices that will inform the Scottish Government's development of the HLOS. Before the Scottish Government publishes its requirements, the ORR will be providing Advice to Ministers. Following the HLOS, Network Rail will publish its Strategic Business Plan later in 2017 prior to the ORR's regulatory determination in 2018.

The industry is continuing to work with government to provide advice, analysis and support in this area. The HLOS will be framed by the requirement to sustain the network, principally through specifying the outputs required from Network Rail's operating, maintenance and renewals (O, M & R) expenditure for the next regulatory funding period. At present the assumption is that current levels of PPM and customer satisfaction will be maintained. Any changes in these measures would drive changes to the level of expenditure required to operate, maintain and renew the railway.

The industry will continue to working to ensure that the outcomes specified by government meet the needs of passengers and freight shippers. Establishing a simple, credible approach to measuring and incentivising strong train performance will need continuing and transparent engagement between Network Rail, train operators, the Scottish Government and rail user representatives.

Performance outputs are a key element of the broader range of outputs that the ORR will require Network Rail to deliver. The industry is actively engaged in the ORR's current consultation on track access charges, and is working with the Scottish Government to ensure that the process reflects the circumstances and requirements of the railway in Scotland.

The level of performance delivered will be influenced by any capacity-related interventions that the Scottish Government chooses to specify. The industry held extensive discussions with the Scottish Government as part of the Scotland Route Study, and further engagement before the HLOS will ensure that performance objectives and expenditure on capacity-related investment are developed on a consistent and integrated basis.

As the industry moves towards a pipeline-based approach to both strategic planning and the delivery of investment, processes will continue to develop. The industry is working closely with government to inform the HLOS and the regulatory review process, as well as applying lessons learned from recent experience. The advice presented here is part of an integrated and ongoing approach to ensuring that plans are clear, flexible and responsive to a changing environment – encouraging and supporting the delivery of a rail system that meets Scotland's needs both today and in the future.

Appendix 1

This Appendix sets out, in question order, the industry's response to the consultation questions. It is intended to provide a quick reference for wider stakeholders as well as a restatement of the industry's response to the challenges that have informed the development of this advice

Question 1

'1. Do you agree with our vision and approach? Will they help us to achieve the Scottish Government's purpose of increasing sustainable and inclusive economic growth?'

The rail industry agrees with the overall approach proposed by the Scottish Government. It wishes to continue to work closely with government to develop policies and support investment and delivery geared towards helping the Scottish Government meet its wider economic and social objectives, and meet the expectations of passengers and freight shippers now and in the future.

Question 2

'How might we make trade-offs and prioritise between different types of investments, while ensuring that our actions are aligned with our vision?'

Note that this question refers to the types of trade-offs that may be required (e.g. where improvements to journey times may impact on levels of connectivity, or vice versa) rather than actual names/locations of schemes promoted or supported by stakeholders.

Trade-offs are inevitable when planning a complex system. It serves a number of markets, and in doing so provides benefits to passengers and freight shippers as well as delivering the wider transport objectives of the Scottish Government. Because of this diversity, the railway has to recognise that investment and service choices will need to be optimised if the benefits that can be realised through an integrated programme are to be maximised.

The industry understands that trade-offs have to be recognised and considered when specifying investment in services and infrastructure. The delivery of a priority on one part of the network may only be deliverable (in the absence of additional funding) by increasing risks elsewhere on the network.

A good example of this is the delivery of the Airdrie-Bathgate line, which significantly improved and integrated rail connectivity between Edinburgh and Glasgow, but operating an intensive end-to-end service increases the performance risk exposure of both the Glasgow and Edinburgh networks. The overall value and benefits delivered by the service is significantly positive, but the example illustrates the need for funders to assess the likely effects of investment on the current network and its users.

The key to making the appropriate trade-offs is to ensure that the transport objectives of investment projects are clearly set out and specified by the bodies that fund the railway in Scotland (including, but not exclusively, the Scottish Government).

Furthermore, decisions made by funders need to take account of all relevant costs and all relevant benefits. The industry's Passenger Demand Forecasting Handbook (PDFH) and Transport Scotland's STAG tools are key to assessing and developing proposals. The industry wishes to build on its role, both as current provider of services and as system operator, to engage at an early stage to support the development of deliverable, affordable schemes and to work with the Scottish Government and wider stakeholders to maximise the opportunities for delivering outcomes that deliver the highest potential gain for Scotland.

Appendix 1

Question 3

'3. Do you support the move to a more flexible 'pipeline' approach to scheme delivery, that does not force us to make early decisions on a detailed specification prior to the commencement of the five-year regulatory control period, without receipt of a robust business case?'

The industry strongly supports the move to an enhancements 'pipeline'. It views the adoption of this approach to be both unavoidable – given the change in Network Rail's status - and highly desirable from the perspective of enhancement project development, risk management and delivery optimisation.

Working on a pipeline basis will also permit enhancements to be more efficiently managed by the industry's supply chain. The benefit of avoiding investment 'bow waves' - driven by regulatory cycles rather than by market conditions, funder aspirations or asset condition – is a key learning point from the industry's delivery failures in CP5. The proposed approach is also consistent with the possibility that enhancements may have more than one funder, for instance in partnership with the various City Deal Partnerships that are currently in place across Scotland.

The proposed approach will require the industry and the Scottish Government to agree a common understanding to developing and resourcing projects. Network Rail is currently working with Transport Scotland to agree a Memorandum of Understanding (MoU). Agreeing the principles supporting the MoU and its implementation needs to be a priority for both parties before the publication of the HLOS.

Question 4

'4. What are your views on the retention or removal of individual ring-fenced funds?'

The industry recognises the role that ring fenced funds have played in delivering improvements to the Scottish network in CP4 and CP5. They ensure that the investment funding the Scottish Government provided to Network Rail is used to deliver outputs that the Scottish Government values and not just those outputs where Network Rail has specific regulatory or financial incentives. They also increase the flexibility available to the industry, providing it with sufficient discretion to take forward investments and interventions that deliver benefits.

Overall, the package of Ring Fenced Funds developed for the current control period – and the guidance structure within which they have operated - has worked well. However, the Scottish Government has an opportunity to consider how it wishes the arrangements to continue most effectively.

In particular, the industry considers that a trade-off needs to be made between a larger number of relatively low-value and tightly-targeted funds and a smaller number of funds potentially larger in scope. Transparent and effective governance arrangements, in the context of the MoU and the wider development pipeline, are likely to be able drive better value for money, especially when aligned with choices on train service outputs. Given the challenges the industry faces, there is a potential opportunity (on the basis of business cases) to develop integrated schemes for routes that cut across the boundaries of the current funds available.

However, where the objectives of Ring Fenced Funds are clear, and where the guidance supporting them is clearly understood, they are an effective mechanism for translating Scottish Government policy into action. Their inherent challenges need to be accepted and sufficient flexibility built in to ensure that they support Ministers' vision, are transparent and have clear governance integrated with the wider planning process.

Appendix 1

'5. What alternative sources of funding could be used to help deliver the rail investment programme?'

The rail industry at a GB level is prioritising the development of sources of third party funding to continue improving the railway for passengers and freight users. The industry in Scotland will work with the Scottish Government in developing opportunities that reflect Scotland's priorities and context.

Building on the links that already exist with local authorities and wider stakeholders would permit the industry to integrate with funding streams such as City Deals and Section 75 contributions (or its potential successor). These links have yielded significant third party contributions to support the proposed station openings at Robroyston and Kintore. They can also ensure that transport is integrated within wider spatial development strategies ensuring that these strategies deliver best overall value-for-money.

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An important requirement in relation to third party funding is having clarity of purpose and clear industry objectives. The railway in Scotland exists to support the Scottish Government to meet its wider economic, environmental and social objectives. Third party funding of the railway in Scotland has to be consistent with these objectives if it is going to deliver significant benefits to rail users and to its principal funder.

Third party funding needs to be integrated with wider strategic planning, to maximise the economic value of the railway. Schemes need to be developed that do not simply pass costs on to other funders (potentially in the form of lost revenue or bringing forward enhancement schemes) or to rail users (in terms of increased fares, poor performance or overcrowded trains), and which are consistent with the overall direction of Government strategy.

The System Operator will be able to support the over arching interests of the Scottish Government (as set out in its appraisal guidance and stated policies) on an independent basis to ensure that third party funding of the railway in Scotland is consistent with these wider policies. Likewise, the System Operator will need to ensure that third party investments are not subject to undue discrimination from the principal funder in Scotland

'6. Do you agree with our approach to emissions reductions and climate change adaptation? What else should be considered?'

The industry supports the approach set out in the Rail Infrastructure Strategy. As with safety, the environmental impact of rail needs to be considered in the wider transport context. Even with increased market penetration of electric cars, rail is well-placed to meet the Scottish Government's environmental objectives where there is a sustainable market and where the volume of traffic (passenger and freight) permits efficient use of energy.

The Scottish Government and the industry need to work together to ensure that the railway has sufficient capacity to accept additional traffic. This may require investment from the Scottish Government in some areas, but in other areas different policy responses – for example, managing demand onto off-peak services – could enable the cost of infrastructure enhancements to be deferred.

The industry also understands and is responding to the need for the railway to adapt to climate change. In practical terms, the increasing frequency of extreme weather affects passengers and freight shippers through service disruptions and consequential impact to journeys. The industry would therefore want to work with government to develop an approach that prioritises the identification and mitigation of climate-related risks on the network, in parallel with the industry's general drive to manage and improve the delivery of operational performance.

One of the choices for funders, the electrification and enhancement of the Edinburgh Suburban Line, demonstrates the whole-industry approach. It will make the whole network more robust by improving its diversionary capability and resilience, rather than its entire capacity being utilised to provide specific service enhancements. The Scotland Route Study identified other potential schemes of this type that can impact on network resilience, and specific funding may be required if the network is to respond positively to the challenges posed by climate change.

Appendix 1

'7. Do you agree with the proposed approach to specifying performance outputs?'

As discussed in the industry's response to Question 2, network performance has to be considered in the wider context of the outputs that the Scottish Government needs the railway in Scotland to provide. Choices that enhance other forms of connectivity – most notably changes to service frequency or new train services (for instance, by extending the network or by opening new stations) – can have effects on performance, and these need to be recognised by funders when setting performance outputs.

As 70% of delay minutes are secondary, and therefore related to traffic volumes, the specification of performance outputs and measures need to be considered carefully by the Scottish Government working with the industry to put passenger and freight expectations at the centre of their specification.

The industry's advice is that the performance outputs that are specified should, firstly, reflect how passengers experience delays so that the railway is incentivised to deliver what passengers actually value rather than creating an abstract measure and, secondly, be the result of a collaborative policy development process that ensures that any unintended consequences of alternative approaches are identified as far as is reasonably possible.

The proposal contained within the Rail Infrastructure Strategy document to set an output based on the value of delays is interesting, and is certainly something the industry would like to explore further with the Scottish Government as part of a broader exercise.

'8. How should performance be balanced against the wider priorities for reduced journey times and the full utilisation of existing and new capacity?'

As illustrated, performance – both punctuality and reliability – needs to be understood in the same context as timetabled journey times and service frequency; all are aspects of broader rail connectivity and, as discussed in question 2, improvements to one form of connectivity may require trade-offs. The industry estimates that a minute spent on a delayed service in Scotland is worth approximately three times more to passengers than a minute spent on a punctual service.

On a mixed-traffic railway where traffic (in terms of train kms) has approximately doubled over the last two decades, and where 70% of delays are a result of knock-on delays rather than the direct impact of the original incident, the industry considers that recognising the complex geographical nature of capacity utilisation and service recovery decisions should be considered as part of Scottish Ministers' specification of network outputs.

The industry wishes to support the Scottish Government in ensuring that it has clarity as to the priorities in terms of performance, capacity and journey times that it will take forward, and to identify potential choices that may involve some element of trade-off.

Enhancements to increase network capacity on a network where passenger demand is highly 'peaked' may have relatively weak business cases compared to alternative available policy options. These alternatives should be carefully considered and, where it is cost effective to do, tested in a delivery environment to determine whether they meet passenger and freight needs effectively.

Question 9

'9. Do you have a view on our approach to safety? How can the closure of level crossings be better supported?'

The same legal framework for railway safety applies in England, Scotland and Wales and Railway Group Standards also have a GB-wide scope. The industry supports this position because it ensures that both transport operators and their users (particularly users of cross-border services) have consistent messaging and are able to make decisions based on a common understanding of best practice.

Level crossings will remain the highest risk locations on the rail network, and funding which is allocated on the basis of the Fatalities and Weighted Injuries (FWI) will inevitably allocate safety funds to the most populous parts of the GB network. However, ALCRAM and its FWI calculation does take into account the low traffic volumes and low user volumes in terms of it being a risk, but we do not have sufficient crossings that sit in the high linespeed usage category to compete with other crossings on GB rail. This presents a problem in so far as the risk ranking at level crossings will always be compromised by line speed and traffic improvements which can ultimately stifle route enhancements, therefore it would be desirable to deal with crossings now based on a 20-30 year plan. To continue to improve safety over existing level crossings where closure is not an option, the funding which is currently provided by Westminster Government enables some safety benefits to be fitted to existing crossings to give FWI benefits. However, additional funding could also benefit the performance on some routes on which the crossing is placed by upgrading or adding safety benefits which could enable the line speed to be increased but providing the necessary safety to the public. There is a need to ensure that this type of funding is also considered when use of the closure fund is not an option

The Scottish Government's £10 million level crossing closure fund in the current control period was a particularly welcome recognition of this aspect of rail safety and the industry would welcome a continued commitment in this area beyond 2019.

However, even despite the support provided by GB and Scottish Government funding, the number of level crossing closures that are likely to take place in Scotland is not as high as the industry would have liked.

The reasons for this are complex, but relate as much to wider land use policies as they do to funding. The 2016 Land Reform Act Scotland would add additional steps to level crossing closures, particularly in relation to rights of access over private level crossings. The industry would like to work with Scottish Government and local authorities to address some of these challenges.

Question 10

'10. Do you support our approach to innovation and new technologies?'

The industry welcomes the increased emphasis on innovation within the rail industry and agrees with the Scottish Government that opportunities to innovate will need to be taken if the cost of maintaining both the operational railway and delivering future enhancements is to be reduced.

However, the industry is not at present convinced of the need for a specific innovation fund. The Scottish Government should focus its attention on ensuring that challenging but achievable incentives are put in place for Network Rail and ScotRail through their respective regulatory settlement and franchise agreements. It should aim to work with the wider industry to identify opportunities, and, where necessary, to assist in breaking down perceived or actual barriers to innovative practices that deliver benefits to passengers, freight shippers and the wider economy.

Appendix 1

'11. Do you have any other views on how innovation could be better supported through the HLOS process and Network Rail's broader management of the rail infrastructure?'

Purposive, outcome-based regulation is considered to be the most effective way of incentivising Network Rail to deliver an efficient railway in Scotland. The industry view is that a strong and coherent business case would need to be developed. This would support the introduction of additional complexity and potentially constraining requirements for innovation independently of supporting a whole-industry approach that places passengers and freight users at the centre of decision-making. As discussed in forthcoming Rail Technical Capability Delivery Plan.

Innovation is a complex area, and the industry wishes to work with the Scottish Government to understand the extent of the innovation 'problem', the barriers that prevent the existing incentives framework from operating effectively and the potential mechanisms for addressing these barriers. Inefficiencies in the industry are often related to the operator/infrastructure interface, and the Scottish Government should take the opportunity provided by the HLOS to provide clear direction to the industry – including the ScotRail Alliance - of the outputs it will require and how these relate to its desired outcomes, rather than specifying inputs.

In terms of funding innovatory approaches, these risk premiums could potentially be better managed through Network Rail's overall settlement. This would increase the focus within the industry of understanding these risk premiums thoroughly on a case-by-case basis and ensuring that innovation is considered across the whole portfolio of rail activities rather than as a specific end in itself.

Rail Delivery Group

The Rail Delivery Group (RDG) was set up in 2011 to provide leadership to Britain's rail industry, bringing together the owners of Britain's passenger train operating companies, freight operators and Network Rail.

Its mission is to promote greater co-operation between these groups through leadership in the industry and by working together with Government, the supply chain and stakeholders.

The RDG is committed to the long-term health of the railway as well as the need to see improvement in the shorter term. It does this by developing strategies for the industry to put into practice and by proposing solutions for policy makers to implement.

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