

Strategic Transport Projects Review Final Report



October 2009



Final Report

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1 INTRODUCTION

THE CHALLENGE

- 1.1 A safe, efficient and effective transport system is a key enabler of a successful and dynamic nation. We all use transport, or rely upon it for the movement of goods, services and people, as part of our daily lives.
- 1.2 The challenge for the Scottish Government is to bring forward proposals which, individually and in combination, support the Scottish Government's Purpose to create a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth. These proposals must ensure that each of us, no matter where we live, can share in the benefits, thus promoting cohesion and solidarity amongst our communities and citizens. They must give business the confidence to invest in Scotland, knowing that the Scottish Government will provide the support they need in terms of sustained transport provision. We must be adaptive and visionary, whilst being sensitive to the individual needs of our communities and the environment within which they sit.
- 1.3 Our use of transport is shaped by our choices as individuals and communities. Each of us has differing expectations and demands of our transport system. Scotland is a diverse nation, and our expectations and demands reflect this. Our outlying areas rely on road and rail connections to overcome their distance to international gateways and key markets. The Highlands and Islands, for instance, depend on the provision of safe, reliable and direct links on strategic corridors such as the A82, A835, A9 or the Highland Main Line.
- 1.4 Our main population centres have different requirements in terms of the volumes of traffic and the impacts this creates. Their rail and road links can be congested during peak periods; which creates economic and environmental problems, that together can undermine the role these centres play in supporting the nation's economy. Aberdeen and Inverness are key regional centres in their own right, but also require effective connections to each other, to the Central Belt and to the rest of the UK. Glasgow and Edinburgh are central to Scotland's economic prosperity and together, they function as an internationally significant economic area. Effective transport links play a crucial role in achieving this.
- 1.5 At the same time, recent work on climate change has identified the challenges facing transport in securing the Scottish Government's commitment to reduce emissions by 80 per cent by 2050. It is recognised that the pathways identified for the major contributors to climate change are particularly difficult to achieve for transport, but that there is a clear requirement to draw from and respond to the current policy context in Scotland, the UK and internationally. However, it is also evident that a number of relevant transport policy levers are reserved outside the remit of the Scottish Government. Scottish transport policy and investment cannot address the issues on its own; but it must, so far as is practicable, support wider efforts to reduce emissions.

IMPROVING TRANSPORT PROVISION – PROGRESS SO FAR

- 1.6 In meeting this challenge, the Scottish Government will be building on a solid foundation. Much of the strategic transport network currently performs well in terms of its objectives. In addition, key improvements are already being delivered.
- 1.7 The rail network provides competitive journey times and service frequency between Scotland's two largest cities of Edinburgh and Glasgow, and provides the means by which many workers get to their jobs in the main city centres each day. After closure for almost 40 years, the Stirling – Alloa – Kincardine rail line has been reopened to passenger traffic, and planning is ongoing for the Edinburgh to Glasgow Improvement Programme, which, like the Forth Replacement Crossing, is a 'fast-tracked' element of STPR. Significant improvements have also been carried out at Edinburgh Waverley station, supporting wider service enhancements in the south east. Work to deliver the Airdrie to Bathgate rail line is well advanced, and the Waverley rail link is under development. Together, these will bring further improvements to the nation's public transport system.
- 1.8 Improvements to the Trunk Road network are also being delivered. The Clackmannanshire Bridge at Kincardine has recently been completed. Construction of the M74 Completion in Glasgow and of the M80 (Stepps to Haggs) are both underway and the M8 (Baillieston to Newhouse) upgrade has been to public inquiry. Both significant improvement and maintenance work has been carried out on existing roads (e.g. the A77, the A78 Ardrossan to Stevenston and the A830 Arisaig to Loch Nan Umah). Local schemes focusing on specific transport issues, such as the A9 Ballinluig junction, A9 Carrbridge 2+1 section and the A80 Auchenkilns roundabout have been implemented. As well as physical infrastructure improvements, demand management initiatives supported by intelligent transport systems are also being introduced.
- 1.9 These improvements to the transport network have already contributed towards delivering the Scottish Government's Purpose – promoting sustainable economic growth. They have provided additional capacity on congested parts of the network, improved accessibility along the affected corridors, provided journey time reductions and helped to improve safety on the network. Road accident casualties have fallen substantially over the past 10 years (by around 20 per cent, with numbers killed or seriously injured falling by 33 per cent¹), even though demand for transport and road usage have grown significantly over the same time.

THE STRATEGIC TRANSPORT PROJECTS REVIEW

- 1.10 In spite of this progress, there continues to be many locations where the nation's strategic transport network can be improved through more effective operation and maintenance, making better use of existing capacity, or implementing targeted infrastructure enhancements. Transport schemes can take a long time to implement, even once a decision has been made to proceed. In order to ensure that Scotland's transport system is fit for the demands placed upon it, plans must be made now for all types of future improvement.

¹ Scottish Transport Statistics No 26, December 2007, Scottish Government (National Statistics)

- 1.11 Transport Scotland has undertaken the Strategic Transport Projects Review (STPR) to help this planning for the future. The STPR has identified strategic transport interventions which reflect the diversity of the country whilst addressing the issues that currently exist or are expected to exist in the future.
- 1.12 This Summary Report is based on the work undertaken and reported in a series of more detailed reports, setting out the STPR process. The purpose of this Final Report is to define the background against which the STPR has been conducted, to clarify points where necessary or reflect consultation responses and to provide an overview of the conclusions contained in the detailed reports, particularly in terms of:
- The key strategic transport issues that have been identified by the review process; and
 - The transport investments which most effectively support the Scottish Government's stated Purpose by addressing these issues.

Scope of the STPR

- 1.13 The STPR identifies interventions to be delivered, designed or developed in the period beyond our current investment programme. Just as transport improvements have been, and are being made in advance of the STPR period, the delivery of the STPR will not mark the end point in improving Scotland's transport network. The changing demands of the 21st Century and continued need to address important issues such as climate change, economic growth and social exclusion will demand continued action. In setting out interventions, the STPR marks an important step forward and establishes the basis upon which future action is taken.
- 1.14 The interventions within the scope of the STPR provide only a part of the overall transport investment in Scotland. In particular, the interventions proposed are additional to those schemes which have already been committed. There are also many other interventions which are outside the scope of the review, but which still constitute a commitment to the improvement of transport provision in Scotland. Examples include many local schemes for road and public transport enhancements, as well as initiatives to improve ferry services, or to improve provision for walking and cycling.
- 1.15 Local Authorities and Regional Transport Partnerships have responsibilities for relevant local and regional aspects of the nation's transport system, and the Scottish Government's concordat with the Local Authorities recognises that many transport interventions are best delivered locally. This has allowed the STPR to remain focused on the strategic transport network, leaving priorities for smaller scale improvement interventions which are not strategic in their scope or funding requirements to be developed and delivered by the Local Authorities and their Regional Transport Partnerships. The STPR has specifically excluded interventions that are the responsibility of Local Authorities and Regional Transport Partnerships to develop and deliver, although there may be occasions where the interventions proposed are complementary.

- 1.16 The STPR concentrates on those interventions that are within the current competence of the Scottish Government, or reflect the Scottish Government's aspirations for better connections to the rest of the UK. It is focused on land based interventions; ferries, other shipping links and air connections are addressed by other initiatives. Maintaining and improving rail and road links to ports and airports has, however, been an important consideration in the development of interventions identified in the STPR.
- 1.17 The STPR has been completed using the Scottish Transport Appraisal Guidance (STAG)². STAG advocates an evidence-based, objective-led appraisal framework which allows the identification and appraisal of interventions most likely to address identified issues. Importantly, STAG is a multi-modal appraisal framework (allowing rail and road based interventions to be considered on a common basis), and has multiple appraisal criteria (covering environmental, safety, social and policy issues as well as economic performance).

Assessment of Issues, Opportunities and Objectives

- 1.18 The process of identifying interventions started with an assessment of current and future demand, in the context of the Scottish Government's Purpose and Strategic Objectives. This was followed by the identification of gaps, shortfalls and opportunities in the current and anticipated performance of the strategic road and rail systems.
- 1.19 The assessment was undertaken in the context of 20 route corridors, the urban networks of Aberdeen, Dundee, Edinburgh and Glasgow, and the strategic nodes of Perth and Inverness.
- 1.20 A set of transport-specific objectives was developed from a number of evidence-based sources, including the Government Economic Strategy³, the National Transport Strategy⁴ and the National Planning Framework⁵ (along with the then developing second National Planning Framework⁶).
- 1.21 Based on the particular characteristics and future transport issues identified for each of these study areas, and the associated goals outlined in Chapter 4 of this Report, a number of specific objectives were derived for each corridor, urban network and strategic node (these are listed in Annex B).

Shortlisting Interventions in the STPR

- 1.22 A range of interventions was developed to address the identified goals and objectives. These were initially derived from sources including Regional Transport Strategies, workshops with key stakeholders and other research. The interventions were specified to include all types of possible improvement and were categorised accordingly – including:
- Action plans to optimise the effectiveness of existing transport networks;
 - Measures to achieve greater operational efficiency of these networks; or

² Scottish Transport Appraisal Guidance, the Scottish Government, June 2008 (www.transportscotland.gov.uk/stag/home)

³ The Government Economic Strategy, Scottish Government, November 2007

⁴ National Transport Strategy, Scottish Executive, December 2006

⁵ National Planning Framework, Scottish Government, April 2004

⁶ National Planning Framework 2, Scottish Government, Consultation Draft, January 2008

- Investments in services or infrastructure to provide additional capacity, where this might be necessary.

1.23 Those potential interventions which were assessed as contributing significantly towards the identified objectives were then appraised against the STAG criteria; Environment, Safety, Economy, Integration and Accessibility and Social Inclusion. The shortlisted interventions outlined in this report represent those schemes which are:

- Consistent with meeting national Strategic Objectives and wider Scottish Government policy;
- Strategic in nature (e.g. meeting national rather than local needs);
- Assessed as providing the most effective and economic means of addressing identified strategic transport issues;
- Assessed to be feasible, deliverable and offering value for money, so far as it is practical to state; and
- Deliverable by, or require significant support from, the Scottish Government.

1.24 An important consideration is that the interventions should support the Scottish Government's Purpose, and the individual interventions have been assessed in terms of the level at which this is achieved.

1.25 In identifying the interventions presented in this report, it is important to recognise that the results of the appraisals reflect the differing roles and issues of the individual corridors, nodes and networks. This makes it difficult to directly compare the results of the appraisals on a cross corridor basis. An economic benefit arising from an intervention in a remote area may, for instance, be less in absolute terms than that of improving a route in a more populous area. It may well be proportionally more significant, however, for the community it serves.

Strategic Environmental Assessment and Appropriate Assessment

1.26 Transport's potential impacts on the environment have been critical to the development and consideration of the STPR. The Scottish Government's Purpose has a clear emphasis on sustainability and the supporting Strategic Objective of a Greener Scotland focuses on improving the country's natural and built environment and the sustainable use and enjoyment of it.

1.27 A key part of the process of the STPR process – from identifying the issues through to developing and assessing the range of interventions – has been the undertaking of a Strategic Environmental Assessment (SEA). The STPR has been subject to a SEA, as required under the Environmental Assessment (Scotland) Act 2005. This SEA has included the following activities:

- Consideration of the views of the Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH), the Scottish Ministers (Historic Scotland) and Health Scotland regarding the scope and level of detail that was considered appropriate for the Environmental Report (ER);
- The definition of a methodology allowing an ER to be developed on a national scale, addressing the 20 transport corridors and 6 nodes and networks defined under STPR, across a common set of appraisal criteria and to a common standard:

- Preparation of a draft ER on the likely significant effects on the environment of the STPR, which included;
 - identification and consideration of the baseline data relating to the current state of the environment over most of the Trunk Road and rail networks;
 - Links between the STPR and other relevant strategies, policies, plans, programmes and environmental protection objectives;
 - Reviewing the STPR's objectives to improve their consideration of, and focus on, environmental issues;
 - Identifying existing environmental problems and constraints in the area likely to be affected by interventions;
 - Identifying the STPR's likely significant effects on the environment (positive, neutral and negative);
 - Considering the measures envisaged for the prevention, reduction and offsetting of any significant adverse effects;
 - Providing an outline of the reasons for selecting the alternatives chosen; and
 - Monitoring measures to ensure that progress is being made and any unforeseen environmental effects are being identified, so allowing for appropriate remedial action to be taken.
- Consultation, which generated 55 responses from a variety of sources;
- Consideration of the ER and consultation responses in making decisions regarding the STPR recommendations; and
- Preparation of a programme to monitor the significant environmental effects of the implementation of the STPR. This also aims to identify unforeseen adverse significant environmental effects and enable appropriate remedial action to be taken.

1.28 A Post Adoption Statement has been prepared for the STPR in line with the various requirements of the Environmental Assessment (Scotland) Act 2005. This has been published separately and an addendum to the Environmental Report has also been published, outlining those areas where the ER has been updated or amended. The Post Adoption Statement should be referred to for an understanding of its content and impact on the STPR.

1.29 In addition to the SEA, an Appropriate Assessment was also undertaken to support STPR and published as an Appendix to the draft ER. This addresses the requirements of the Habitats Directive. This protects Natura 2000 sites, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), that are designated as being of sufficient importance to warrant significant protection. The Appropriate Assessment is important in that its conduct ensures that only those interventions identified as not adversely affecting designated sites proceed.

2 THE ROLE OF TRANSPORT

CONTRIBUTION TO THE SCOTTISH GOVERNMENT’S PURPOSE

- 2.1 Transport plays a critical role in meeting the Scottish Government’s Purpose. An efficient transport system is one of the key enablers for enhancing productivity and delivering faster, more sustainable economic growth. Enhancing Scotland’s transport infrastructure and service provision can help open up new markets, increase access to employment and help build a critical mass of business that can drive up competitiveness and deliver growth.
- 2.2 The role of transport is given context by several strategies, each of which has been published to address part of the often changing setting within which the design, development and delivery of transport is undertaken. The STPR is specifically mandated in the Government Economic Strategy³ and has considered the ways in which infrastructure could potentially respond to the challenges and opportunities identified by the Key Strategic Outcomes. The STPR is also mandated in the National Transport Strategy⁴ and further contextualised by the National Planning Framework⁵ and the Scottish Climate Change Bill.
- 2.3 The interventions proposed by the STPR have been selected to support the delivery of Scottish Government policy and contribute to the Scottish Government’s Purpose.

THE GOVERNMENT ECONOMIC STRATEGY

- 2.4 The Government Economic Strategy³ states that the overarching Purpose of the Scottish Government is *“to create a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth”*. This means building a dynamic and growing economy that will provide prosperity and opportunities for all, while ensuring that future generations will also be able to enjoy a better quality of life.
- 2.5 The Strategy sets targets to track progress in boosting Scotland’s growth, productivity, population and labour market participation, and in delivering on the desired characteristics of growth – solidarity, cohesion and sustainability. The five strategic priorities of: learning, skills and well-being; supportive business environment; infrastructure development and place; effective government; and equity are identified as being critical to economic growth.



2.6 The Scottish Government's Purpose is supported by specific Strategic Objectives for Scotland – that it will be:

- **Wealthier & Fairer** – Enable businesses and people to increase their wealth and more people to share fairly in that wealth;
- **Smarter** – Expand opportunities for Scots to succeed from nurture through to life long learning ensuring higher and more widely shared achievements;
- **Healthier** – Help people to sustain and improve their health, especially in disadvantaged communities, ensuring better, local and faster access to health care;
- **Safer & Stronger** – Help local communities to flourish, becoming stronger, safer places to live, offering improved opportunities and a better quality of life; and
- **Greener** – Improve Scotland's natural and built environment and the sustainable use and enjoyment of it.

2.7 The Strategic Objectives are supported by the Key Strategic Outcomes for transport identified by the National Transport Strategy, while the National Planning Framework establishes the spatial context for the nation's development. These are discussed below.

NATIONAL TRANSPORT STRATEGY

2.8 The National Transport Strategy (NTS), along with its associated documents for rail⁷, bus⁸ and freight⁹, was published in 2006. Many of the specific commitments of the NTS have been delivered since it was published, and the Delivery Plan for the NTS identifies how the remainder will be taken forward.

2.9 Three Key Strategic Outcomes for transport are identified in the NTS (and subsequently endorsed by the Scottish Government) and are aligned to the Scottish Government's overall Purpose:

- **Improving journey times and connections**, to tackle congestion and the lack of integration and connections in transport that impact on the potential for continued and economic growth;
- **Reducing emissions**, to tackle the issues of climate change, air quality and health improvement; and
- **Improving quality, accessibility and affordability**, to give people a choice of public transport, where availability means better quality transport services and value for money or an alternative to the car.

2.10 As described above, these Key Strategic Outcomes for transport have been used within the STPR as a basis for identifying the specific objectives for each corridor, urban network and strategic node which have in turn informed the appraisal process and the identification of the recommended interventions.

⁷ Scotland's Railways, Scottish Executive, December 2006

⁸ Buses, Moving into the Future, An Action Plan for Buses in Scotland, Scottish Executive, December 2006

⁹ Preparing for Tomorrow, Delivering Today, Freight Action Plan for Scotland, Scottish Executive, November 2006

NATIONAL PLANNING FRAMEWORK

- 2.11 The National Planning Framework (NPF2), was published in June 2009. This has been developed alongside the STPR. It will take forward the spatial aspects of the Government Economic Strategy as well as providing detail on the spatial development of Scotland up to 2030. NPF2 will play a key role in co-ordinating policies with a spatial dimension and integrating and aligning strategic investment priorities to enable each part of the country to play to its strengths in contributing to the Scottish Government's Purpose and Strategic Objectives. It focuses strongly on priorities for the improvement of infrastructure to support Scotland's long-term development and supports the three Key Strategic Outcomes of the NTS.
- 2.12 NPF2 identifies 14 National Developments, many of which have direct implications for the future operation of the strategic transport network. The status of these proposals has been recognised in the development of the STPR, and appropriate interventions have been identified to support the National Developments where required. This does not imply that STPR interventions are required for all of the National Developments, since several already have adequate arrangements or committed schemes associated with them. The National Developments cover a variety of themes, including transport, energy transmission and flood management.

CLIMATE CHANGE

- 2.13 The Scottish Climate Change Bill establishes a framework to facilitate the reduction of greenhouse gas emissions in Scotland to a level below that which will lead to continued global warming. The Bill creates mandatory climate change targets to reduce Scotland's emissions and creates new legislative means to do so. This provides business and society with a clear signal from Scottish Government of its seriousness in tackling this issue and provides Scotland with the certainty it needs to make the right choices now. The Bill signals to the international community Scotland's serious intent to contribute to the global effort to mitigate climate change and provide a strong example to other countries showing what can be done.

Transport and Climate Change

- 2.14 Transport is a significant contributor to emissions, yet is widely regarded as being one of the most difficult areas in which to achieve substantial long term reductions in emission levels. The reasons for the difficulty are varied. Demand for transport is growing, car ownership is generally increasing and the use of the vehicles themselves is also increasing. Overall demand for transport, in terms of vehicle trips, is forecast to increase by 19 per cent between 2005 and 2022, with an associated increase in road transport carbon emissions.
- 2.15 Assumptions used in estimating CO₂ output in the STPR assumed a worse case scenario in each case. For instance, rail interventions are assumed to use diesel rolling stock unless the intervention specifically proposes electrification and no allowance is made for the generation of electrical power using renewable sources. As the rail network is progressively electrified, therefore, the local or regional impacts arising from diesel emissions on specific routes would typically reduce. The use of renewable generation sources would, in addition, lock in benefits at a national level. Consequently the benefits that may arise in carbon terms from the STPR are, potentially, greater than those specifically quoted.

- 2.16 In addition, transport is generally an outcome of other decision making processes, including business investment decisions, choices about where to live, where children attend school and where to work. It is extremely difficult to address the end result of the thousands of individual choices through interventions focused on transport alone. In order to break the link between the demand for travel and emissions a wide range of measures must be considered across a wide range of policy areas, which fall into the categories of:
- Technological enhancements;
 - Behavioural change; and
 - Investment in sustainable modes of transport.
- 2.17 Current forecasts for the year 2022 indicate that, in the absence of significant technological or behavioural change, total road transport carbon emissions will increase from 2005 levels by some 10 per cent¹⁰. This is lower than the forecast growth in vehicle miles, reflecting the impact in the changes in the composition of the vehicle fleet as older vehicles are replaced by more efficient vehicles. It is also forecast that there will also be above-average increases in emissions in those parts of the network where planned development results in higher car use and congestion, especially in Aberdeen and Edinburgh.
- 2.18 Although car engine efficiency is expected to improve over time, the effect of this improvement is offset to some extent by faster than average growth in the use of Light Goods Vehicles. These create higher levels of emissions than the car fleet, and have not been subject to the same level of regulatory pressure to improve their efficiency and emissions. Unlike Heavy Goods Vehicles (where encouraging transfer of freight to rail would be expected to have a beneficial effect), there is relatively little opportunity within the context of the STPR to address this particular issue.
- 2.19 Total emissions from rail transport are small in comparison to those of road traffic – contributing about two or three per cent of total transport emissions. Encouraging modal shift from road to rail will certainly be helpful, but the impact on total emissions of any rail intervention will inevitably be modest in the context of the desired level of overall reduction given the dominance of road transport emissions.
- 2.20 The NTS recognises that there is a tension between the desire to have the strategic networks contribute to both economic growth and social cohesion in Scotland through providing better connections and faster journey times, while at the same time minimising the impact on the environment of the emissions associated with increased travel. The strategy recognises that there is a strong link between economic activity and rising transport demand in creating a sustainable Scotland, and that there is a challenge in addressing this and in increasing the public acceptability of some of the instruments that are known to be effective in reducing emissions.

¹⁰ Forecast Carbon Dioxide Equivalent (CO₂e) emissions, based on output from TMfS05a and TMfS05h models

- 2.21 This challenge is widely recognised. The UK Government's Environmental Audit Committee note, in their report on Reducing Carbon Emissions from Transport, that *"Transport is an especially challenging sector in which to reduce carbon emissions largely because it is so dependent on oil: 99% of all transport in the UK currently runs on oil products, and transport accounts for 74% of the UK's consumption of oil. ... Additionally, transport is obviously intimately involved in transactions of all material goods; it has been estimated, for instance, that 95% of all goods in the shops currently arrive there using oil. This means that it may be especially difficult to decouple carbon emissions in the transport sector from economic growth."*¹¹ The recent King Review of low-carbon cars adds that *"In 2000, cars and vans accounted for 7 per cent of global carbon dioxide (CO₂) emissions. This proportion is rising as economic growth brings the benefits of widespread car use to the world's emerging and developing economies. Under a business-as-usual scenario, global road transport emissions would be projected to double by 2050. The global challenge is to support increases in road transport use, in a sustainable, environmentally-responsible way."*¹²
- 2.22 Whatever the difficulties, it is clear that the expected trend for transport emissions is not sustainable. There is recognition that technological and behavioural levers can be used to make a significant contribution in changing this trend, potentially to a greater extent than investment to encourage modal shift. These measures for the most part are outside the direct scope of the STPR (involving changes other than pure transport interventions), but could for example include:
- Examining the impact of alternatives to physical travel (e.g. the growth of the Internet for business-to-business and personal shopping and the explosion in home deliveries for a wide range of goods and services ordered through the Internet);
 - More general reduction of the need to travel through continuing review of the Planning processes to ensure that transport is properly considered when drawing up new plans;
 - Driver training to encourage more efficient driving techniques; and
 - Encouraging the use of cleaner vehicles and lower-carbon technologies, including Light Goods Vehicles (e.g. developing initiatives through the creation of an Innovation Fund, providing pump-priming funding to allow public agencies and private sector operators with large vehicle fleets to renew or replace their fleets with cleaner vehicle technology such as electric vans). The Scottish Government is consulting on the use of low carbon vehicles during the summer of 2009.
- 2.23 Many of the policy levers that are most likely to reduce transport emissions are outside the current competence of the Scottish Government, being reserved to UK Government (e.g. vehicle taxation and fuel duty) or to EU level (e.g. product standards and emissions trading). Decisions on transport infrastructure are also closely linked to other policy areas within Scottish Government (such as housing and regeneration), and need to be viewed in that context.

¹¹ Reducing Carbon Emissions from Transport, Ninth Report of Session 2005–06, Volume I, House of Commons Environmental Audit Committee, August 2006

¹² The King Review of low-carbon cars, Part I: the potential for CO₂ reduction, HM Treasury, October 2007

Contribution of the STPR

- 2.24 In recommending a specific portfolio of transport interventions, the STPR has used modelling techniques to assess the contribution that these interventions might make to Climate Change through changing carbon emissions. It must be recognised that any individual intervention will have a minimal impact at a national level, although it is clear that investment in public transport and, where appropriate, rail freight will result in a reduction in levels of emissions.
- 2.25 In this context, it is worth recognising that the majority of the recommendations arising from STPR are public transport based and that those which do focus on the strategic road network are typically concentrated on maintaining, safely operating and optimising its use. The contribution of the STPR to Climate Change targets is strongly influenced by this and has tended to assume a worst case impact wherever emissions have been calculated.
- 2.26 While the modelling tools used for STPR represent current best practice, they can be rather limited in their capability and approach when applied to the relatively small scale of individual interventions. The tools have therefore been used to assess the overall effect of the full list of the interventions recommended by the STPR (and summarised in this report).
- 2.27 Considering the measures overall, it is forecast that there would be a reduction in road based transport carbon emissions of between 100,000 and 150,000 tonnes CO₂e per year. This compares with an estimated 11.9 Mt of CO₂e attributable to all forms for transport in Scotland in 2005 (27 per cent of the total Scottish CO₂e emissions of 43.8 Mt)¹³, or 9.7 Mt for road transport, assuming this accounts for 22 per cent of total CO₂e¹⁴ – i.e. a reduction of around one per cent.
- 2.28 In general terms, the STPR has been carried out on the basis of ensuring that the strategic transport network will be better placed to respond positively to the technological and behavioural changes which will happen over the next ten to fifteen years, while minimising the potential environmental impact by encouraging behavioural change in favour of more sustainable travel. For example:
- Improving journey times for rail on intercity journeys, to make rail competitive with journey times by car and making the best use of the urban rail networks for commuting into city centres; and
 - Focusing on provision of reliable journey times for trunk roads, through tackling congestion where it affects journey time reliability, through maintaining reliable and safe networks, through managing demand for the network and through targeted capacity enhancement.
- 2.29 The next chapter considers some of the emerging issues identified from this review, in the context of the transport goals identified on the basis of the relevant strategies and policies. Each of the interventions identified by the STPR has been taken forward specifically on the basis of addressing these issues and of contributing towards these goals and objectives, with the aim of optimising transport's potential to contribute to the Scottish Government's Purpose.

¹³ Key Scottish Environmental Statistics, the Scottish Government, August 2008

¹⁴ UK Emissions of Air Pollutants 1970 to 2005, Defra

3 STRATEGIC TRANSPORT ISSUES

SCOTLAND'S STRATEGIC TRANSPORT NETWORK




- 3.1 The principal focus for most movements in Scotland, whether people or freight, is in, around and between its cities. A review of Scotland's cities carried out in 2002¹⁵ noted that *"cities are our major points of economic activity and social interaction"* and it goes on to state that *"transport is central to the economic, social and environmental future of Scotland's cities"*.
- 3.2 The economic draw of Scotland's cities extends their influence over a wide area; this is recognised through the consideration of the role of City-Regions in many policy documents, such as the National Planning Framework. Travel to work is particularly important. Such movements are focused along key radial routes, many of which coincide with routes linking the cities. These corridors are key parts of the national strategic transport network.
- 3.3 The STPR is not focused solely on the cities or their connections. Scotland is a diverse nation and the accessibility of remoter areas is also vitally important. Consequently, the links to these areas, including road and rail connections to lifeline and gateway ferry ports, are included in the Review.
- 3.4 The STPR has considered 20 strategic corridors linking the urban networks and strategic nodes and the country as a whole. The review is targeted specifically at the road and rail links along these corridors. While the links to and from ports and airports are a vital part of this strategic network, the STPR has considered only the land-based access, and has not covered the air and sea links themselves. The corridors, urban networks and strategic nodes covered by the STPR are illustrated on the following page.

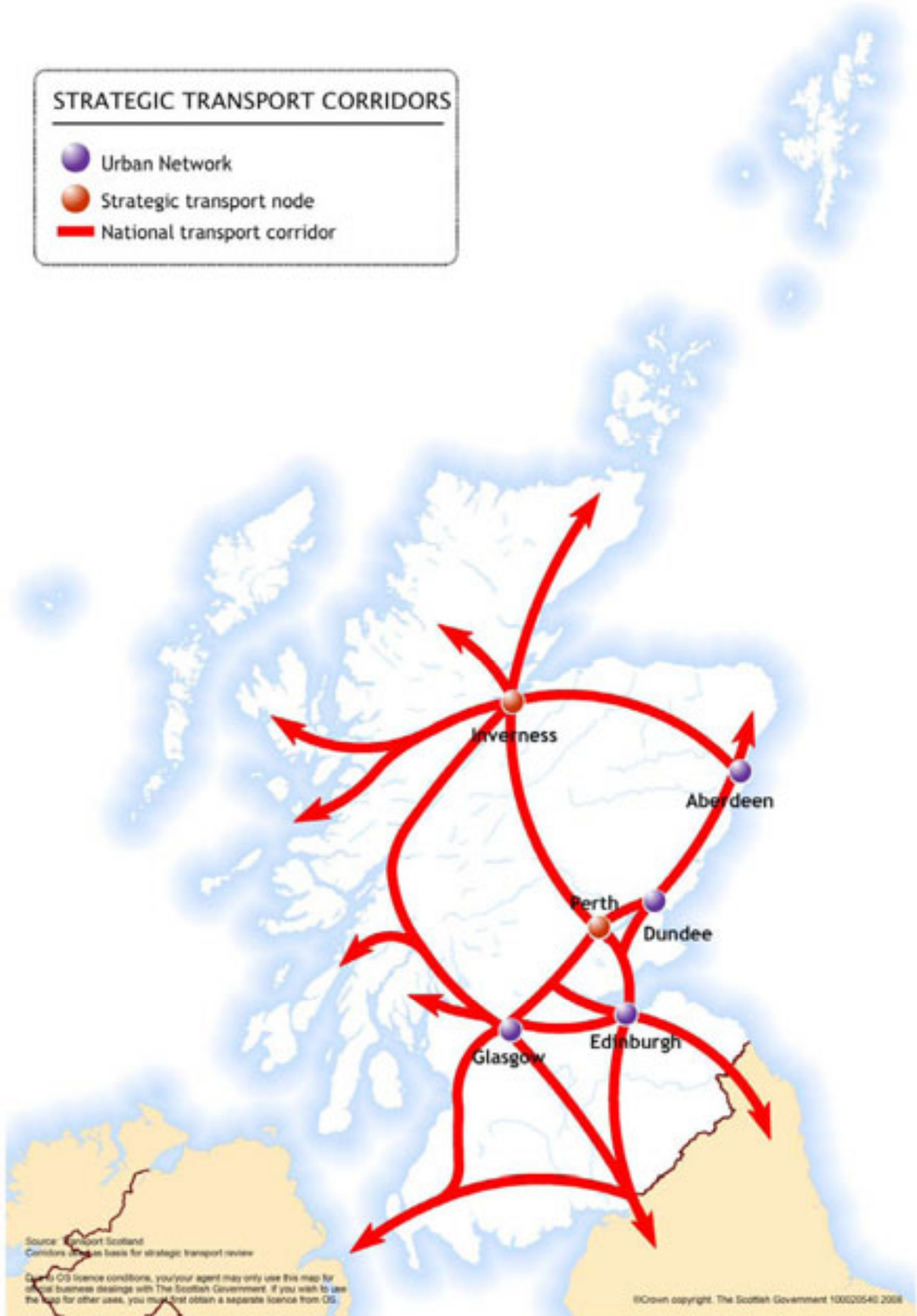
Functions of the Strategic Transport Network

- 3.5 The National Transport Strategy recognised the critical importance of providing efficient road and rail links between Scotland's cities, stating that *"our strategic networks are particularly important for connecting our cities, connecting our towns with cities and bringing people and goods to those cities"*. The Strategy also recognised that strategic networks are *"critical for providing key routes into our wider regions, including the Highlands and Islands, to our regeneration areas, to England and to global markets to contribute to the accessibility of Scotland as a whole through road, rail and port connections. This means the strategic networks have a particular role in providing for the longer intercity and inter-region journeys."*
- 3.6 In the context of the STPR, the primary transport functions for the national strategic transport network are defined as:
 - Linking major urban centres and areas of population change;
 - Providing links to international gateways, airports, ports and borders;
 - Linking remoter communities;
 - Linking key tourist areas;
 - Facilitating freight routes; and
 - Linking areas of economic activity and regeneration areas of national significance.

¹⁵ A Review of Scotland's Cities – The Analysis ("Better Cities, New Challenges"), Scottish Executive, 2002

STRATEGIC TRANSPORT CORRIDORS

-  Urban Network
-  Strategic transport node
-  National transport corridor



Source: Transport Scotland
Corridors shown on basis for strategic transport review

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Future Demand for Transport

- 3.7 An effective transport system is a key factor in promoting economic development. In Scotland, the transport system must accommodate the varying demands of the nation, both now and into the future. Scotland's cities are major economic drivers, with relatively high value employment and dynamic business sectors. The remoter areas play different roles in agriculture, tourism and high value exports. Furthermore, Scotland's population is forecast to rise over the period covered by the STPR, with expected net in-migration¹⁶. This growth will bring differing pressures as demand for travel and pressures on the road and rail networks change through time.
- 3.8 The STPR has involved in-depth forecasting work to assess future travel demand and the consequential impacts on the transport network. This starts with population and employment forecasts relating to expectations that were developed in recent years as part of local, regional and national planning processes. It should be noted that the forecasts have been developed in a manner that ensures realistic forecasts at a total national level with a consistent view of the expected distribution of this future population and employment: this may not always be entirely consistent with the full implications of all local development aspirations.
- 3.9 The land use and development expectations have been assessed using the Transport, Economic and Land-use Model of Scotland (TELMoS) planning model and observed current travel behaviour to forecast trip generation and thus travel demand across the country. The impact of this demand on the strategic transport network has then been assessed using the Transport Model for Scotland (TMfS) transport demand and supply model.
- 3.10 As part of the development of the STPR travel demand forecasts and consideration of future issues, many different data sources have been used to provide detailed information on all aspects of travel on the strategic network. These include:
- The Transport Model for Scotland;
 - Rail industry data on rail passenger patronage and Network Rail Documents;
 - Published regional and national transport statistics;
 - Transport Scotland / Scottish Government Policy Documents and associated studies;
 - Congestion monitoring reports;
 - Scottish Roads Traffic Database;
 - Scottish Transport Statistics;
 - Transport Scotland's Road Information System;
 - Transport Scotland's Accident Database;
 - Local and Regional Transport Strategies;
 - Scottish Household Surveys and Public transport user surveys;
 - Other data and reports produced on behalf of Public transport operators;
 - Environmental mapping; and
 - The Environmental module from the Transport Model for Scotland.

¹⁶ General Register Office for Scotland Mid-2006 population forecasts

- 3.11 In summary, the analysis shows that the greatest population and employment increases between 2012 and 2022 are expected to be in the Central Belt, particularly in and around Edinburgh. In addition, significant growth in levels of both population and employment are forecast in the Inverness area, particularly to the east of the city. Other parts of Scotland are also planning for population increase, although in general, the pattern of population distribution across Scotland will remain similar to the existing distribution for some time to come.
- 3.12 Within some urban areas, there is some move of population to peripheral locations. This dispersal of homes and jobs to the edges of cities may lead to increases in travel demand, over and above that from economic growth alone, as the average distance between the origins and destinations of trips increases. It is also likely to have an impact on travel patterns, particularly for commuting and business journeys: the traditional, radial routes served by public transport are less likely to meet the emerging travel needs of a redistributed population, in which case the private car could provide a more attractive alternative.
- 3.13 At the same time, as the nation becomes generally more prosperous, car ownership would be expected to rise. Coupled with this, longer commutes and greater reliance on the car for accessing dispersed homes and jobs risk leading to greater car usage. This may therefore result in greater demand for travel by car on the road network, with the potential to adversely affect road freight movements and bus travel (although this would also be expected to generate increased demand for rail travel).
- 3.14 Overall demand for transport, in terms of vehicle trips, is forecast to increase by 19 per cent between 2005 and 2022. Demand for rail travel is forecast to increase by more than this, with an underlying growth (not including the generative effect of planned rail improvements) of around 47 per cent, but bus demand is forecast to fall over the same period, leading to a forecast decline of three per cent in the overall usage of public transport¹⁷.
- 3.15 Regeneration areas will focus on sustaining economic activity in local communities, providing a more even spread of activity across the country. Similarly, plans for substantial development in areas away from the Central Belt, such as in the vicinity of Inverness, provide stability and opportunity locally. Given the size of Scotland's urban areas, the locations of new major employment or shopping facilities will have significant impacts on the local demand for transport and distribution of traffic.

Alternative Future Scenarios

- 3.16 The planning data assumptions used in TELMoS are broad estimates that will be influenced by evolving circumstances. Any significant change in economic circumstances (e.g. significant immigration, a major new oil or gas discovery, identification of a new regeneration zone) could not only alter local impacts on the network but could have ramifications well beyond the immediate vicinity. While the TMfS provides a consistent basis for examination of likely operation of the transport system, and therefore a framework for assessing various interventions, it must be recognised that the results from the model will be dependent on the inputs fed into it.

¹⁷ Forecasts based on Transport Model for Scotland (TMfS 05a v3.1) and TELMoS. Rail forecasts are compatible with the forecasts used by Government in producing the Scottish High Level Output Statement for rail

- 3.17 The inputs used in the STPR assessments represent just one possible scenario of the future. In appraising potential interventions, and more particularly the way in which these support economic development and social inclusiveness, the impact of a number of different scenarios have been considered. The factors affecting these scenarios include future economic growth, different possible land use planning assumptions, and the possibility of higher prices for fuel than currently assumed – e.g. through oil price increases or through introduction of carbon related taxes.

Economic Growth and Planning Assumptions

- 3.18 One of the drivers of transport demand in TELMoS is the forecast growth of the Scottish economy in terms of gross value added (GVA). The effect on transport demand resulting from any change to this assumed GVA growth would depend on the extent to which the variation in growth is split between additional employment and additional productivity.
- 3.19 The main effect of a revised GVA outcome in terms of the forecast transport issues in STPR and of the assessment of transport interventions would be one of timing rather than a fundamental shift in conclusions. An overall slow-down in the economy would allow timescales for the interventions to be extended slightly, while faster economic growth across the period would lead to pressure for faster implementation of the interventions.
- 3.20 Changes to the detailed land-use planning assumptions within TELMoS, on the other hand, could lead to some re-prioritisation of the schemes recommended. For example, the STPR modelling has assumed some specific areas of high population growth. If the planning pressures were to change in such a manner that encouraged high growth to occur elsewhere, then this might tend to bring forward the requirement for schemes in this new area of high growth.

Fuel Price and Tax Assumptions

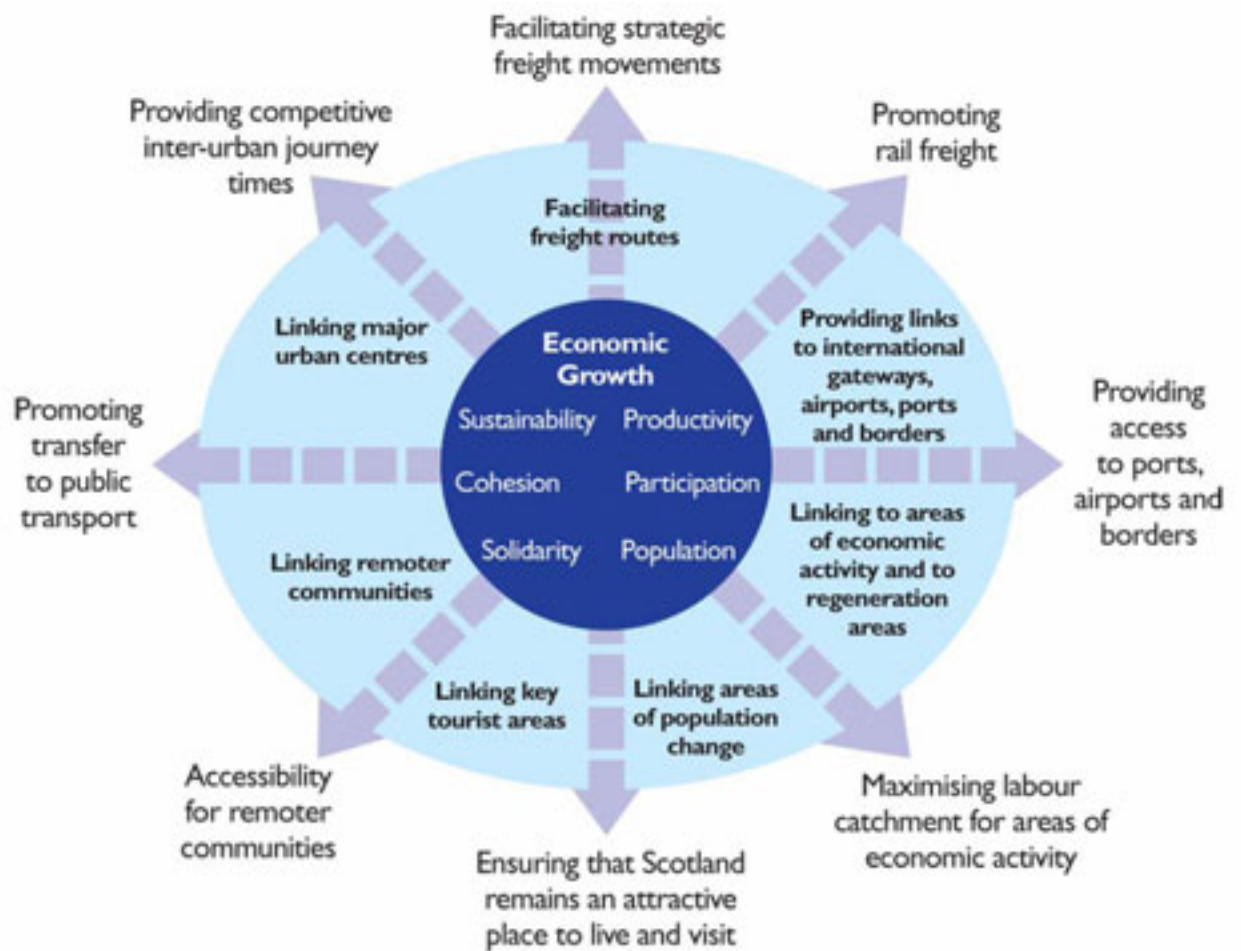
- 3.21 The price of fuel in the UK is closely related to the price of oil with the price of petrol increasing as oil prices increase (with a short time delay). Analysis suggests that a doubling of oil prices for example would lead to a 36 per cent increase in the price of a litre of petrol, allowing for the effects of fuel duty and refining costs.
- 3.22 Clearly, the volume of traffic (as measured by vehicle kilometres travelled) would be influenced by such a change in the price of fuel. However, research¹⁸ suggests that demand is likely to be relatively inelastic (i.e. a given percentage increase in the price of fuel leads to a rather smaller percentage change in volume of traffic). A 36 per cent fuel price increase over central forecast levels would imply a long-run reduction in vehicle kilometres of only just over ten per cent compared to the central forecasts – i.e. halving the central growth forecast of 19 per cent increase. It would be expected that this level of fuel price increase would produce rather faster rail growth than forecast, increasing rail demand by slightly less than ten per cent above central forecast levels.
- 3.23 In spite of higher fuel prices, growth in vehicle trips over the forecast period would still be expected. As with changed planning assumptions, the effect would be one of different timescales, rather than completely different outcomes. However, in this scenario emerging changes in the relative priority between road and rail schemes may be expected.

¹⁸ "Elasticity of Road Traffic and Fuel Consumption with respect to Price and Income: A Review", Goodwin P, Dargay J, Hanly M, Transport Reviews, Vol 24, No. 3, pp275-292, May 2004

- 3.24 The need to reduce transport-based emissions of carbon dioxide has already led to an announcement in the 2008 UK Government Budget of a change to vehicle excise duty with higher emitting vehicles paying higher rates of duty. Further incentives to reduce emissions might conceivably be considered in future, e.g. based around the introduction of a “carbon related tax” reflecting the damage costs of climate change caused by each additional tonne of greenhouse gas emitted. Current estimates of the value of the damage effect of carbon emissions would imply a tax equivalent to around six per cent of the price of fuel. On this basis, a relatively small effect on total travel demand (around two per cent) would be expected from the introduction of such a tax.

Emerging Goals for Transport Provision

- 3.25 There are many challenges facing the future of Scotland’s national strategic transport network on the basis of the issues arising from the forecast growth. Addressing these is key to supporting the Scottish Government’s Purpose. The STPR has been undertaken in this context, and completed with a view to assessing the challenges, and identifying those interventions that can play the most effective role in addressing the transport issues identified.
- 3.26 On the basis of the functions of the strategic transport network and its ability to contribute to the Indicators of the Government’s Purpose, a number of goals and issues emerge. These goals provide a framework to consider the future challenges and priorities for the network, and in which the corridor and node-specific transport objectives have been developed for the assessment of schemes within the STPR.
- 3.27 The goals for transport provision are shown on the following page. Drawing from the STPR analysis of transport issues, opportunities and objectives described in the detailed Reports 1 and 2 from the study, the individual themes are discussed in summary in the sections that follow.



PROVIDING COMPETITIVE INTER-URBAN JOURNEY TIMES

- 3.28 Whilst technology changes may reduce some aspects of overall travel demand, there is still a need to travel to do business and this is expected to persist. A high proportion of this “daily business” travel is currently focused on Edinburgh and Glasgow, although the need for access to other cities and areas of economic activity is also very important. Effective business communication depends on a reasonable travel time which is consistent and reliable.
- 3.29 Improving the connectivity between the cities of the Central Belt and between them and the other urban centres in Scotland will therefore help to underpin economic growth and spread the benefits of that growth. It is important that access to or from centres more distant from the Central Belt including Inverness and Aberdeen should be considered in terms of the potential to improve service frequencies or reduce overall journey times.

Edinburgh / Glasgow Conurbation

- 3.30 The cities of Edinburgh and Glasgow, and the towns and urban areas in and around these cities experience road congestion on the approaches to the cities and on the major estuarial crossings. This congestion impacts on the efficient movement of people and goods. Over the period to 2022, road congestion is forecast to expand over a large area on the approaches to Edinburgh and Glasgow and to intensify on the approaches to all of the major urban areas. This means that freight or business trips may take longer or be more likely to experience delay and reduced journey time reliability due to congestion or other disruption.
- 3.31 Without any interventions, average speeds in the corridor between Edinburgh and Glasgow are forecast to fall over the STPR period to half of the free-running speed¹⁹. Delays at non-grade-separated junctions on routes accessing the M8 are a key contributor to this delay. In this corridor, the trip pattern is diffuse with a wide range of origins and destinations: city-to-city trips represent less than 10 per cent of the total. Peak congestion occurs particularly on approaches to cities as through traffic and local access traffic meets at key junctions – for example at Hermiston Gait on the A720 Edinburgh City Bypass.
- 3.32 Major motorways take traffic through Glasgow and provide access for city bound traffic. Completion of motorway connections should permit study of differential measures for access and through traffic to enhance journey time reliability.

Linking in other Urban Centres

- 3.33 While Edinburgh, Glasgow, Perth and Dundee are all within a reasonable travel time of each other, Aberdeen and Inverness are not. Both the distances for Aberdeen and Inverness are further than for the other cities. The average speeds are also typically lower. At particular times of the day Aberdeen is more than three hours away and Inverness is more than three and a half hours away from the centres of Edinburgh and Glasgow. These two centres are isolated not only from the main centres of economic growth but also from each other, with journey times of well over two hours between the two cities.
- 3.34 This presents a different set of problems in that these centres are less able to interact with the rest of the country or derive benefits from business or freight movements. Reducing journey times between such centres and the Central Belt, whilst supporting the more immediate issues of these areas themselves is an important objective in pursuing the Scottish Government's Purpose.
- 3.35 While cities and towns outside of the Central Belt are forecast to remain relatively congestion free in off-peak periods, peak congestion on the approaches and at key nodes is already apparent and is forecast to worsen. There are conflicting demands on available capacity at peripheral junctions between through and local access traffic. A number of strategic routes continue to be routed through towns and communities rather than bypassing them, meaning that severance, visual intrusion, noise and emissions can be problems – for example the A90 Kingsway in Dundee and the A737 and A77 in Ayrshire.

¹⁹ Source: Transport Model for Scotland

- 3.36 In terms of peak access to these cities outside of the Central Belt, there is the opportunity to learn from the experiences of Edinburgh and Glasgow by intervening before the problems become acute, for example by supporting public transport.
- 3.37 Also for remoter areas, the impact of seasonal changes can be more obviously felt than for the cities within the Central Belt. The additional strains imposed by tourists in the summer months and of harsh conditions in winter need to be considered in assessing network capability. In addition, there is the need to recognise the wider, regional role of cities such as Inverness, over and above their size, as they provide services and access to airports, lifeline services locally and to the rest of Scotland nationally.

Journey Time Reliability

- 3.38 The Congestion Report²⁰ highlights that currently, across the busiest sections of the road network, journey time reliability is good overall, over most of the day. However, this is not the case at all times, and it is evident on some road sections that poor journey time reliability is already a significant problem in peak periods.
- 3.39 With the traffic volumes forecast for 2022 on the strategic road network, the use of the road capacity on the approaches to most of the major urban centres and on the main roads across the Central Belt is likely to be approaching levels at which higher impacts on journey time reliability will be experienced. Journey times in the height of the peak will become measurably and consistently longer with persistently lower speeds. Periods of congestion or delay will extend more widely into the rest of the travelling day, significantly affecting travel time reliability for a greater number of users.
- 3.40 The geography of Scotland itself gives potential for particular reliability issues. It is important that emphasis should be placed on the maintenance and safe operation of the existing assets to ensure that strategic routes are kept open under all conditions, as there might not be readily available alternatives. There is a need for resilience in the network – either in terms of alternative routes or in terms of the availability of the assets – particularly when it comes to considering the available routes for crucial freight operations.
- 3.41 The issues associated with a lack of alternative routes apply equally to major crossings such as the Forth and Tay crossings, as well as to many of the routes into the more remote areas both in the north and the south of the country. The Forth Road Bridge is a key link in the strategic road network. Due to the condition of the existing bridge and its identified lifespan problems, it was decided that a replacement was required. On 19th December 2007, Ministers announced their choice for a cable stayed bridge as the preferred replacement for the existing Forth Road Bridge.
- 3.42 There are also opportunities in some locations for improving reliability through better use of the road capacity that is available – using intelligent transport systems (including motorway controls), and demand management systems (including integrated traffic control) to increase the operational efficiency of the network and improve reliability. The current applications of these systems are relatively limited in terms of geographical coverage and technological capability. Systems have been developed in isolation and have not been fully coordinated between the local and national systems.

²⁰ Congestion on Scottish Trunk Roads, 2003 and 2004, Transport Scotland

- 3.43 Within urban areas, there are opportunities to better integrate the operation, maintenance and management of urban traffic control systems and public transport priority and information systems. On inter-urban routes, there is the possibility of introducing Active Traffic Management. There are also opportunities better to provide pre-travel and interchange information through such internet and telephone based systems as Traffic Scotland²¹ and Traveline Scotland²² for passengers, and Freight Scotland²³ for freight operators.

Case Study: Use of Intelligent Transport Systems

The M8 motorway / A8 trunk road between Edinburgh and Glasgow is the principal road link between Scotland's two largest cities. The M74, M77, M80 and M8 form the main arterial routes into Glasgow, while the M8, M9 and M90 form the main arterial routes into Edinburgh. The A720 forms the Edinburgh City Bypass to the south of the city.

Much of this road network is dual two lane motorway, other than the M8 through Glasgow between Baillieston and Paisley which varies from dual three lane motorway to dual six lane motorway, and the A8, A90 and A720 which are dual carriageway trunk roads.

Within and on approach to Edinburgh and Glasgow, this road network is congested during peak periods. The congestion is caused by the high volume of traffic on the motorway and the interaction with the significant levels of local traffic at junctions. This congestion adds delay to trips during these periods and decreases journey time reliability.

Intelligent Transport Systems (ITS) comprise of a number of different measures that can work individually or be integrated. These include Variable Speed Limits, ramp metering, delay information displays and hard shoulder running. ITS can help to reduce delays, improve journey time reliability and increase capacity, making best use of the existing motorway and trunk road network.

Variable Speed Limits help to increase the capacity of the road network by smoothing traffic flow and reducing cases of stop-start traffic that occur when traffic volumes increase. This stop-start traffic can result in queuing on the motorway. By reducing this, average speeds can increase, journey time reliability improves and the volume of traffic able to use the motorway can increase.

Ramp metering has similar benefits in that it reduces the impact of traffic joining the motorway on traffic already on the motorway. Whilst this can increase delays for traffic joining the motorway, there are overall improvements to journey times and system reliability.

Delay information displays provide information to drivers to inform them of how long to expect it will take to their destination. This can reduce driver frustration and improve driver behaviour.

Managed hard shoulder running could vary depending on the location, with potential priority given to buses, high occupancy vehicles or Heavy Goods Vehicles (HGV). Using the hard shoulder would reduce delay and increase the capacity of the motorway. In some cases, road widening might be used to generate an additional lane for this purpose or to provide lay-bys for broken down vehicles.

²¹ <http://www.trafficscotland.org/>

²² <http://www.travelinescotland.com/>

²³ <http://www.freightscotland.org/>

PROMOTING TRANSFER TO PUBLIC TRANSPORT

- 3.44 Particular issues have been identified in terms of the need to provide access for all, particularly those without the use of a car, and in terms of contributing to action to address the forecast increase in emissions resulting from the continuing growth in private car use. Provision of improved public transport services can help with these issues, by providing a reasonable level of access for the vulnerable and by encouraging everyone to switch away from car use and onto public transport.
- 3.45 Around Edinburgh and Glasgow in particular, a comparatively high proportion of trips are already made by public transport. As road congestion increases in these areas, rail could become relatively more attractive. There should be an opportunity to build on the widespread familiarity of bus and rail use to maintain quality access with competitive journey times, in reasonable comfort and with good reliability.
- 3.46 However, buses are adversely affected by road congestion unless targeted measures are taken to prevent this, and overcrowding already exists on peak rail services in some areas which is likely to worsen. Limited car parking at some stations and physical constraints on increasing rail capacity will, if left unchecked, lead to overcrowding and deterioration of performance. These factors are likely to limit the attractiveness of public transport (or reduce its ability to meet longer term growth in demand), in the absence of targeted investment.
- 3.47 In more rural areas, low service frequency and longer journey times are the more pressing constraints on use. The type of intervention being considered within the STPR does not, however, lend itself to smaller scale service or infrastructure improvements more commonly associated with rural public transport services.

Rail Services

- 3.48 Rail has an important contribution to make towards achieving a safe, integrated, effective and efficient transport system for Scotland. Often offering fast journey times, the rail network provides a reliable and demonstrably attractive alternative to other modes of transport as well as offering the potential for reduced emissions. The rail network in Scotland supports economic growth and development, providing a quality inter-urban link between city regions in Scotland and links to major English cities as well as more local / regional links.
- 3.49 The National Transport Strategy, and its supporting document “Scotland’s Railways”, highlight the role of rail in providing The service patterns that may be delivered in future to utilise any new rail infrastructure will be designed to support these objectives;
- Fast, long distance passenger services between our major urban centres;
 - High quality commuter services into major areas of employment, education and leisure activities; and,
 - Rail freight services for regular high volume and generally long distance flows.

Edinburgh and Glasgow Rail Networks

- 3.50 Many of the rail routes in and around Edinburgh and Glasgow operate close to capacity and experience overcrowding. This overcrowding is forecast to worsen with a two per cent per annum increase in rail demand forecast. Increasing demand, without additional capacity, will lead to overcrowding becoming more frequent and widespread.
- 3.51 Network Rail manages the rail network in Scotland. The condition and capability of the network are specified by the Scottish Government and determined by the Office of Rail Regulator, and Network Rail are subsidised by the Scottish Government in order to ensure that they are able to maintain the network to this level. Modern management and communication systems are already used routinely across the rail network, and the implementation of the maintenance regime appears to provide effective protection of the asset base. In effect, there are only very limited opportunities for improvement in terms of maintenance and safe operation or of making better use of existing capacity on these constrained sections of the rail network. Investment in additional capacity or equipment will be required.
- 3.52 In recent years there has been an ongoing increase in investment. Despite this investment, there are a number of significant infrastructure capacity constraints on the network which particularly affect journeys to work in the Central Belt. Glasgow Queen St, Edinburgh Waverley and Haymarket all have constricted approaches that inhibit simple increases in rail capacity. Platform lengths across the network also add a further constraint, preventing the operation of longer trains. Dealing with these constraints can be expensive – the recent £150m programme of work at Edinburgh Waverley provides an indication of the financial cost of achieving upgrades in heavily congested locations. Incurring such expense may, however, be the only viable option in some situations.
- 3.53 Edinburgh and Glasgow are the main economic drivers of the nation, with GVA levels of £12.5 billion and £13.5 billion respectively: over 30 per cent of the total for Scotland. The prosperity of this twin city region is recognised by the Scottish Government as essential for realising sustainable economic growth. This means making best use of the synergies between the cities and enhancing their respective catchment areas for business. Recognising this, an early part of the STPR involved an assessment of options to improve rail connections between the two cities. This is the foundation of the Edinburgh to Glasgow Rail Improvements Programme (EGIP).

Other Routes in the Scottish Rail Network

- 3.54 Rail capacity on routes serving centres outside the Central Belt is often constrained by sections of single track and lower capacity signalling. With lower frequencies and speeds and mixed stopping patterns, there can be some peak overcrowding on the approaches to the cities. However, this is localised and is forecast to remain so in future.
- 3.55 Although the current provision will accommodate the future demand in most instances, there are key issues with respect to inter-urban journey times between major cities, especially between Aberdeen / Inverness and the Central Belt. Current times are constrained by the nature of the infrastructure, and by the need to call at many intermediate locations. Opportunities need to be sought for provision of enhanced rail services on these routes.

Bus and Rapid Transit Services

3.56 Buses can provide the sustainable mass public transport necessary to support economic growth and accessibility. They are often uniquely placed to provide the essential links needed to enable us all to get to work and to access shops, schools and health services. Buses are currently the principal, most frequently used and most widely available mode of public transport.

3.57 Buses are best at providing:

- Flexible services, which can be developed and introduced very quickly where demand is identified;
- Mass transport in an urban setting, moving large numbers of people - currently around 480 million passenger journeys a year²⁴ – and thereby reducing the amount of congestion on Scotland's roads and of reducing the impact on the environment of emissions; and,
- Accessibility – for many rural, particularly remote rural, areas they provide the only practical alternative to car use.

3.58 Bus access to city centres can be supported by prioritisation. For example, priority is provided in terms of:

- Space – by providing bus lanes or segregated lanes;
- Time – using priority traffic control systems; and
- Money – with subsidised parking charges and concessionary fares.

3.59 These techniques have been effective in supporting the provision of high capacity services in the face of mounting preference to the use of the car. Many of Scotland's cities have bus priority schemes supported by Park-&-Ride at peripheral locations. Road improvements are being developed with parallel public transport measures / investments, such as the Aberdeen Western Peripheral Route and the associated public transport initiatives.

3.60 Even so, while priority measures may help to sustain the competitiveness of the bus, its market is threatened by the growth in car ownership. The street layouts in some older cities may also mean that there are limited opportunities for on-street public transport priority. Without further intervention (based on central forecast planning assumptions and land-use trends), a decline in bus patronage is expected over the forecast period.

3.61 Edinburgh is constructing a new tram system between Edinburgh Airport and Newhaven to strengthen its local public transport services.

²⁴ Moving into the Future, An Action Plan for Buses in Scotland, Scottish Executive, December 2006

Interchange

- 3.62 Within the Central Belt and elsewhere, the trip pattern is generally diffuse with a wide range of origins and destinations. There is a need to consider not only the individual journey legs using public transport but also improvements to the interconnectivity across the network as a whole. Increasing dispersion of homes and jobs and longer travel to work is leading to a forecast doubling of public transport trips that require some form of interchange. This includes interchange from bus to bus, bus to tram, bus / tram to rail and rail to rail. Improved interchange will be critical to ensuring that this forecast growth can be promoted and accommodated.
- 3.63 Physical location of terminals is a constraint (particularly evident in Glasgow). In all cities, good connections between rail, bus (and tram where relevant) will be required, as well as inter-modal ticketing. Pressures for redevelopment of bus or rail stations in increasingly valuable inner city sites should be examined to ensure that the opportunity is taken to deliver enhanced inter-modal connections. Smaller town centres potentially give the opportunity for closer integration of bus and rail interchange but historically, developments often have been separate.

PROVIDING ACCESSIBILITY FOR REMOTE COMMUNITIES

- 3.64 The major urban areas each support a significant rural area beyond the immediate commuter catchment. These more remote areas, including the far north and north-west of Scotland, Argyll and Kintyre, much of Aberdeenshire, Dumfries and Galloway and much of Scottish Borders, all rely on their nearest urban centre for services and other opportunities. The rural areas themselves tend to comprise smaller, remote and dispersed populations – lacking the critical mass of population necessary to support cost-effective public transport provision.
- 3.65 In these more rural areas, congestion is rarely an issue. However, the impact of seasonality is more apparent than for the urban centres. Tourist demand in the summer months and harsh weather conditions in winter need to be considered when assessing network capability. With generally smaller communities, there is scope for a high impact on outcomes when planning new community/employment locations. Careful consideration of land use, development location and transport needs can help to maximise the delivery of the transport objectives.

Roads

- 3.66 Most of the roads are single carriageway with limited overtaking opportunities and often higher accident rates. It is more difficult to provide separately for local access and longer distance traffic. In addition to the safety issues, this also means that severance can be an issue as main roads pass through local towns and villages.
- 3.67 The reliability issues posed by the geography of Scotland become more significant for many of these rural areas, which may be completely reliant on just one or two strategic links for access to their nearest urban centre and to the rest of Scotland. Network maintenance, particularly during the winter months, is vital in ensuring these lifeline links remain accessible and safe. Tackling the isolation of these areas is a key challenge in realising a more cohesive and integrated Scotland.

Public Transport

- 3.68 There are particular problems of isolation and exclusion for those who rely on public transport. Sparse demand, with longer than average travel distances to service and employment centres, leads to infrequent services at relatively high prices. Public transport journey times tend to be uncompetitive with the private car. Rail capacity, where it is available, and journey times are often constrained by operational restrictions imposed by local geography and the historical development of the rail infrastructure.
- 3.69 Consequently, the general population is more dependent on cars to access key services, compared to those in more urbanised areas of Scotland. Those who can afford and are able to do so are effectively encouraged to abandon public transport and use a car. For a minority of the population, however, (particularly the young, disabled and elderly) car-based travel is not feasible. As a result *“In small communities some young people may feel isolated.., while elderly people ...may grow concerned about levels of local support”*²⁵.
- 3.70 For these people, access to key services can be maintained through innovative land-use and travel schemes, often dependent on public sector support. These include demand-responsive transport systems such as community car schemes. National concessionary fares reduce the costs of bus and ferry travel (where the options exist) for the elderly and young. The Air Discount Scheme complements this by providing discounted travel on ‘lifeline’ air links for residents of remote areas. Other innovations include mobile services (e.g. libraries, banks and food vans) and multi-purpose single site operations (e.g. post-offices with grocery services). Services are often operated at smaller scales in combination with each other to maximise available resource and minimise cost. These enable minimum service provision levels to be provided to support local populations.

FACILITATING STRATEGIC FREIGHT MOVEMENTS

- 3.71 The movement of freight is fundamental to the process of economic development. To be able to compete effectively in national and international markets, businesses must be able to provide rapid, reliable and efficient delivery. In recent years, dependence on the freight transport system has increased as globalisation has extended supply lines and as the adoption of the ‘just-in-time’ principle has greatly reduced inventory levels in the supply chain. For a relatively geographically remote country with strong trading links, such as Scotland, these trends present a major challenge. Development of a flexible and sustainable distribution network is needed for Scotland to compete in this global economy, as required for the Scottish Government’s Purpose.
- 3.72 In common with most of Western Europe, the majority of freight in Scotland is carried by road. Currently road haulage accounts for approximately 70 per cent of Scotland’s freight tonnage. Road freight traffic is particularly concentrated on the trunk road network. In 2005, trunk roads, which make up only six per cent of the total public road length, carried 62 per cent of all the Heavy Goods Vehicle traffic on Scottish roads. As noted below (“Promoting Rail Freight”), there are particular issues associated with this road freight traffic in terms of CO₂e emissions and its contribution to congestion on the strategic road network.

²⁵ Community Plan for Highland 2004/07 (Highland Well-Being Alliance)

3.73 Road freight traffic is concentrated in the Central Belt, and in the corridors linking the Central Belt with North West England. The corridors linking to the Upper Forth area, Dundee and Aberdeen are also relatively busy. Regional Distribution Centres are located generally within the triangle of main roads (M8 - A80 - M9) between Glasgow and Edinburgh and these provide a focus for much of the demand.

Freight on Road

3.74 Reasonable and reliable journey times are critically important in the context of the effective movement of freight as they are for the movement of people. Since most freight in Scotland is carried by road, a key issue for freight traffic is road congestion – in common with private vehicles and buses. For freight, there are particular benefits in schemes aimed at keeping local traffic and longer-distance traffic separate, since routes used by local traffic can often be unsuitable for significant freight use. The introduction of Intelligent Transport Systems (ITS) and managed lanes on the motorway network could also be beneficial for freight by offering priority for freight traffic at specific locations.

3.75 Freight is also particularly affected by the geographical challenge of Scotland, and the need to be able to access the remoter communities. The constraints on road alignment and width, steep gradients, and the lack of alternative routes, impose particular problems for heavy freight vehicles accessing these areas. Targeted programmes of road improvements and safety measures can provide particular benefits for freight.

Freight Action Plan

3.76 The key elements of freight transport are drawn together in an agreed strategy. The Freight Action Plan covers all modes of transport - road, rail, air and water, and contains five aims supported by 12 objectives and 20 actions with varying timescales. Its purpose is to make Scotland a place where movement through the entire supply chain is efficient and sustainable, on an integrated and flexible transport infrastructure thus allowing Scotland's businesses to compete and grow in a global economy.

3.77 The Plan includes actions aimed at infrastructure improvements (road, rail and port); tackling accessibility issues faced by rural and remote areas (e.g. Highlands and Islands) and industries (e.g. timber); encouraging modal shift; and ensuring policy integration on freight transport issues throughout the public sector (i.e. between Scottish Government Transport and Planning, Regional Transport Partnerships, Local Authorities, etc). The Freight Action Plan:

- Addresses pinch-points in the transport infrastructure that will reduce congestion and therefore reduce journey times;
- Has actions to improve access to Scotland's ports and develop direct air freight links from Scotland, thus improving connections to markets;
- Proposes actions that will encourage modal shift, reduce fuel consumption and improve road freight efficiency to help reduce emissions; and
- Has actions relating to the transport of timber and addressing freight requirements of businesses and communities in rural and remote areas to improve accessibility.

- 3.78 A Stakeholder Steering Group oversees the delivery of the Freight Action Plan including representatives from central government, the haulage industry, the Enterprise bodies, business, Regional Transport Partnerships (RTPs) and Local Authorities. The work of the Freight Action Plan has been fed in to the STPR process.

Case Study: Targeted Road Quality Improvements on the A82 and A77

The A82 trunk road between Glasgow and Fort William is the principal road link to the west of Scotland. The 108 kilometre section of the route between Tarbet and Fort William is generally rural in nature and consists of a single 2-lane carriageway of varying standards. As there are no alternative routes within the immediate corridor, diversion routes often add significant additional time and distance to a journey. The road is extremely popular with tourists, and crucial for road freight needing to access the West Coast of Scotland.

Much of the carriageway is narrow and many sections do not have hardstrips or verges. The road width is constrained over some sections due to the proximity of lochs, a railway line, rock outcrops and narrow stone bridges and structures. The alignment of the road is also constrained by local topography, particularly on the sections of the A82 between Tarbet and Inverarnan, through the pass of Glencoe and between the Corran Ferry junction and Fort William.

Heavy Goods Vehicles (HGV) on the route are restricted to 40mph by the national speed limit for single carriageway roads, and in many places are constrained to significantly lower speeds by the nature of the road. This leads to car traffic building up behind HGVs, and to a temptation for frustrated car drivers to risk dangerous overtaking moves – leading to safety issues for the HGV driver and for other road users as well as for the overtaking vehicle.

The 126km long A77 is the main link from Glasgow and central Scotland to the ports in Dumfries and Galloway. The ports at Troon, Stranraer and Cairnryan are the three main ‘gateways’ from Scotland to Northern Ireland. The A77 is also the main link to Prestwick International Airport. Approximately 10 per cent of vehicles using the road are HGVs, which tend to be bunched together in ‘platoons’, created by the HGVs arriving for or departing from the ferry services.

There are a number of towns lying directly on the A77 including Maybole and Girvan located in South Ayrshire. The large numbers of cars and HGVs using the route are obliged to pass through the town centres and main streets of these towns – leading to traffic problems caused by the interaction of strategic and local traffic and safety / severance concerns for the pedestrians in the town centres which may have restricted carriageway and footway widths.

On both of these routes, a targeted programme of road quality improvement measures has been developed, aimed at improving road standards and safety and environmental issues, and at reducing congestion. The programmes involve the implementation of a series of local road improvements, each of which has been specified to address existing and emerging problems along the length of the route and to meet local requirements and constraints. These include measures such as road widening, lay-bys, climbing / overtaking lanes, possible grade separation at key junctions, and local bypasses for significant towns on the route.

- 3.79 At regional and local level, public and private sectors are encouraged to work effectively in partnership through Freight Quality Partnerships (FQPs). They bring together RTPs, local authorities, business, environmental groups, and operators to encourage and improve the sustainable distribution of freight. FQPs encourage co-operation to increase efficiency in delivery whilst at the same time protecting communities from intrusion and maximising the benefits of rail and water transport (for example, relaxation of delivery curfews where this would be appropriate, streamlining deliveries through local consolidation centres, developing no car lanes, drivers' rest areas, local road and bridge strengthening). Under the Freight Action Plan, the Scottish Government is monitoring the number and effectiveness of FQPs and plans a progress report highlighting best practice in 2009.

PROMOTING RAIL FREIGHT

- 3.80 Rail freight plays an important role in the movement of heavy, bulk goods and long distance haulage. Three-quarters of the tonnage lifted by rail is made up of minerals, mainly coal. Most rail freight is long-distance, cross-border traffic with only 20 per cent of the rail freight in Scotland being internal to Scotland.
- 3.81 In recent years there has been a sharp increase in the volume of imported coal moved by rail from the Hunterston terminal to power stations in the English Midlands. Overall, coal has accounted for almost all the growth in rail freight traffic over the past 10 years. While road freight in Scotland (measured in vehicle-tonne kilometres) has increased at about two per cent per annum over the 10 years to 2004, rail freight has increased at about 10 per cent per annum over this same period – largely driven by the increase in coal haulage.
- 3.82 Rail has also been successful in capturing new retail traffic from companies such as ASDA, IKEA and Tesco for distribution to their warehouses and shops in Scotland. This intermodal traffic, which is more diverse in terms of final origins and destinations, is now the next most significant market segment after coal. This growth has been achieved in partnership with road-based logistics companies and, in some cases, with the assistance of Freight Facilities Grants.

Avoiding 'Sensitive Lorry Miles'

- 3.83 A review of available data on CO₂e emissions was undertaken for the *Scotland's Railways – Environmental Report*, which found that freight transported by rail produces around one eighth of the CO₂e emissions per tonne kilometre compared to road based Heavy Goods Vehicles. Road based freight also contributes significantly to road congestion (especially on single carriageway routes) and noise in built-up areas. Promoting the carriage of freight by rail rather than road (where feasible and viable) therefore has an important part to play in terms of STPR and wider Scottish Government objectives – helping to tackle both the climate change issues and improving the economic effectiveness of Scotland's transport network.
- 3.84 These relative economic and environmental costs of road-based freight are reflected in the use of 'Sensitive Lorry Miles' as a measure in the assessment of the economic and wider benefits associated with transferring freight from road to rail or water (e.g. in awarding Freight Grants). The measure shows particular value in removing Heavy Goods Vehicles from urban areas and single carriageway roads. The UK Government is currently recalculating the appropriate values to be used for this measure.

Rail Capacity

- 3.85 Future growth in rail freight is constrained by lack of available paths for freight trains over the existing rail infrastructure. Rail freight capacity is constrained at peak periods through south Glasgow and on the approaches to Grangemouth. In addition, there can be problems in finding suitable through paths for freight trains between east and west across the Central Belt. Capacity limitations also affect rail freight outside the Central Belt, both as a result of insufficient paths (especially on routes with single track sections) and inadequate loading gauge for high-sided containers.
- 3.86 In general, where rail route enhancements and additional capacity are being proposed, consideration needs to be given to providing extra capacity for freight – in terms of additional freight paths, clearance for longer trains, and clearance for larger gauge (taller) trains. For example, planned work on the Edinburgh – Glasgow route will include provision for freight services to use relevant sections of the route and to use other associated diversion routes where appropriate. Clearance of gauge restrictions and provision of additional freight loops on routes to Aberdeen and beyond, proposed as part of a wider STPR service enhancement proposal on this route, should help to relieve constraints on freight routeing in that corridor.

PROVIDING ACCESS TO PORTS, AIRPORTS AND BORDERS

- 3.87 The National Planning Framework recognises that economic success will depend on good connections with the rest of the United Kingdom and global markets. A critical function of the national strategic transport network is to address the transport requirements of urban, rural and remote communities in terms of international accessibility, and of the distribution of goods and international trade. This means that connections to the main ports, airports and border crossings, both by road and rail, are of particular significance.

Ports

- 3.88 The role of the ports, and the transport connections to them, is vital in contributing to economic growth, supporting international connections and in terms of cohesiveness for remoter communities. The ports fall into broadly three categories:
- ‘Gateway’ ports linked to world shipping routes, including Rosyth, Greenock, Stranraer / Cairnryan, Hunterston and Troon;
 - Other ports serving mainly freight (including oil), including Aberdeen, Inverness, Peterhead, Leith, Grangemouth and Ayr;
 - ‘Lifeline’ ports serving the Island communities (carrying both freight and passengers), including Scrabster, Ullapool, Mallaig, Oban and Ardrossan.

- 3.89 Grangemouth is Scotland's largest container port, with important European, Baltic and global connections. Approximately 9 million tonnes of cargo are handled through its dock facilities each year. Improvements to strategic road and rail infrastructure are needed to allow the area to function to its full potential as an intermodal freight hub. Rail access in particular is currently constrained by the limited track capacity availability in the Central Belt. Improvements in terms of capacity and gauge for freight services are possible as part of planned passenger capacity enhancement schemes on the Edinburgh – Glasgow route.
- 3.90 On the Forth, there may be opportunities to expand container capacity. There may, for instance, be opportunities to create a new international container terminal at Rosyth as part of the wider development of the dockyard, helping to ensure that Scotland has sufficient container port capacity in future years. There is potential for the port to handle both international traffic and coastal services from English ports.
- 3.91 The ports giving strategic access to Northern Ireland in the south west (Stranraer / Cairnryan) are relatively poorly connected, generally. The Ireland – United Kingdom – Benelux Euro-route follows the A77 and A75 trunk roads via Cairnryan, Stranraer and Dumfries. This road link, together with the A77 heading north to central Scotland and also the rail link to Stranraer are all limited in terms of capacity and speed. As noted in the case study above, the A77 in particular passes through a number of towns, implying delays for strategic traffic and a high 'cost' for freight traffic in terms of Sensitive Lorry Miles.
- 3.92 Ireland's National Spatial Strategy also recognises the potential for moving freight through Scotland to avoid congestion on routes to England's East Coast ports. Moving freight by rail would be the most sustainable approach to developing Scotland's potential as a land bridge between Ireland and the Continent. As well as improvements for the ports in the south west, rail access improvements to Grangemouth and the Forth (along with the reopening of the Stirling – Alloa – Kincardine railway) will also be important steps in that direction.

Airports

- 3.93 Scotland also has 16 airports with scheduled services, of which five (Glasgow, Edinburgh, Prestwick, Aberdeen and Inverness) are international airports, two of which (Prestwick and Edinburgh) handle significant freight volumes. Others are 'lifeline' airports, providing crucial services for island and other remote communities.
- 3.94 The Scottish Government is strongly committed to promoting a shift to more sustainable modes of transport. However, given Scotland's geographical position, good air links are vital for international connectivity and competitiveness. Air links to their countries of origin are important to the people from Eastern Europe now contributing to the Scottish economy, and good international connectivity will be a crucial factor in encouraging more people to come to live and work in Scotland. Taking these factors into account, and in line with the UK Government's Air Transport White Paper²⁶, there is expected to be continued growth in throughput at Scotland's airports.

²⁶ The Future of Air Transport, UK Department for Transport, December 2004

- 3.95 Due to its central location Edinburgh Airport is likely to experience a particularly large growth in traffic over the next 25 years. The Scottish Government has announced that a new airport station will be built at Gogar on the Fife rail line. The construction of the Dalmeny chord, a new line linking the Fife and Edinburgh – Glasgow routes, will allow trains between Glasgow and Edinburgh to stop at the airport station. An interchange with the Edinburgh tram will facilitate onward travel to the airport. Together, these and some of the other interventions outlined in STPR will support the wider development of the West of Edinburgh area.
- 3.96 The services offered by Edinburgh, Glasgow and Prestwick airports are in many respects complementary and there may be potential for strengthening surface connections between them. Linking Scotland's main cities and airports with higher speed trains could offer a much wider choice of destinations, allowing mass passenger transfer between airports, and opening up the South-West to more visitors. In particular, increased capacity on rail services between Prestwick and Glasgow city centre will be required in the medium term.

Cross-Border links

- 3.97 Cross-Border road and rail links are of prime economic importance for Scotland: congestion and lack of infrastructure outwith Scotland can have an adverse impact on access to Europe and other parts of the UK. The economic benefits of tourism can be spread more widely if more of Scotland can be brought within 3 hours of major English cities.
- 3.98 There is a need to improve journey times and the frequency of rail services to key destinations such as London, Manchester, Leeds and Birmingham. This has been recognised in the National Planning Framework 2 with the inclusion of a National Development for High Speed Rail link to London. Developments on these routes are critical in providing an alternative to domestic air travel and achieving modal shift on the cross border trunk roads. A regular and reliable 3-4-hour journey time on existing lines between Central Scotland and London would help to make the train more competitive with flying, and improving Scotland's connection with City Regions in the north of England (where the distances and journey times involved are potentially ideal for securing rail's competitive position) could be particularly important. Reducing journey times on routes between Aberdeen and Newcastle would also improve the connectivity of knowledge economy clusters on the East Coast.
- 3.99 These same rail routes, as well as the Glasgow and South Western route, are also strategically vital for the movement of freight between Scotland and England. Improvements to the West Coast Main Line in particular would allow more cross-Border freight to be moved by rail.
- 3.100 The passenger rail services on these routes are currently operated through long-distance UK rail franchises including Cross Country and Virgin West Coast franchises. Responsibility for these cross border trains rests with the UK Department for Transport (DfT), with the exception of sleeper services which form part of the First ScotRail Franchise. The Scottish Government remains committed to working with DfT to achieve improvements such as:
- The imminent implementation of the West Coast upgrade, allowing a reduced fastest journey time from Glasgow to London of 4 hours 15 minutes;
 - Capacity enhancements along the West Coast corridor to assist freight movements;
 - In the medium term, 4 hour fastest journey times from Edinburgh and Glasgow to London and 3 hour fast through services to Manchester and the North West; and

- In the longer term, a high speed rail link between Scotland, the English Midlands and London, reducing journey times between Central Scotland and London to under 3 hours and providing direct rail services to the Continent.

MAXIMISING LABOUR CATCHMENT FOR AREAS OF ECONOMIC ACTIVITY

3.101 Ensuring that businesses readily draw on an available pool of labour is essential to support economic growth. While forecasts suggest that the labour catchment areas will be maintained broadly at their current extents around most of the significant areas of economic activity, there are particular areas in the Central Belt that stand out as an exception.

Road

3.102 The strategic road networks in Glasgow and Edinburgh are operating close to capacity throughout the working day and there is heavy peak congestion on city approaches. Both cities have invested in public transport access (rail and bus in Glasgow; bus, rail and soon tram in Edinburgh). Even with significant recent investment in public transport, including physical priority measures, concessionary fares and parking charging strategies, there is likely to be continued reliance on the car and an ongoing decline in bus use is forecast. Private car still accounts for approximately 40 per cent of journeys to work in these cities, although this is rather lower than the national figure for Scotland of over 60 per cent.

3.103 Journey times by road to major centres of employment are forecast to increase with Edinburgh and Glasgow expected to suffer the greatest deterioration. Access by road to Edinburgh in particular is expected to be increasingly affected by congestion by 2022, shrinking its viable commuting zone (defined in terms of the area from which peak travel to Edinburgh within 60 minutes is possible). While the commuting zone for Glasgow is expected to remain broadly similar to today, this would be expected to change if forecast reductions in population and employment levels are reversed.

3.104 In addition, the existing speeds and journey times that apply during peak periods on key roads in the Central Belt are forecast to apply across the whole of the working day by 2022 if current trends continue without any mitigation. The prospect of a shrinking labour catchment in the Central Belt has major implications, given the key role of the twin-city region in the national economy. More widely, increased journey times in the Central Belt would have consequential impacts on trips from other parts of Scotland.

3.105 Outside the Central Belt, only relatively slight deteriorations in labour catchment areas for the main centres of employment are forecast.

Case Study: West of Scotland Strategic Rail Enhancements

The area covered by Strathclyde Partnership for Transport (SPT) has a population of approximately 2.1 million²⁷ and is centred on Glasgow. This is the largest and most densely populated city in Scotland, with a population of approximately 575,000²⁸. The city's economy has changed from being largely manufacturing based to one based on the service sector, with a strong performing financial services sector and a significant number of public sector employees. The economy of the city and the region has been growing in recent years and Glasgow is now recognised as one of the fastest growing cities in the UK. The continued growth and prosperity of Glasgow is vital to the Scottish Government's Purpose of sustainable economic growth.

Glasgow is the confluence of many national road and rail links and has an extensive railway network providing inter-urban and suburban links to the surrounding area. The suburban rail network around Glasgow caters for a large number of journeys, and in particular a high proportion of peak journeys to and from the city centre. The recent improvements in Glasgow's economic performance have resulted in rising land and property prices and demand for further development in and around the city. One of the consequences of this is the increase in the number of those working in Glasgow but residing outside the city, increasing the demand to travel into and out of the city at peak times. These longer-distance commuting journeys are ideally suited to rail travel: but in order to accommodate this growing demand, it will be necessary to provide additional capacity.

A number of the key rail service corridors into Glasgow are already identified as having passenger loadings that are currently close to or at capacity, while operational and physical constraints limit the ability to run additional services and meet growing demands (beyond committed schemes). Glasgow Central is already the busiest station in Scotland and is the northern terminus for the West Coast Main Line (providing linkage to London, the Midlands and North West England), as well as acting as the terminus for services from Ayrshire, the Clyde Coast and local services from the south of Glasgow. At peak times, the services from Ayrshire and the Clyde Coast in particular are full, but there is no spare capacity at the station to provide for additional services. In addition, Queen Street station has significant constraints in providing space for additional services beyond the programmed Edinburgh Glasgow Improvement Programme.

There are a number of potential options to provide additional capacity and better linkage. These include:

- The development of a Metro/ Light Rapid Transit network across Glasgow comprising a mixture of conversion of heavy rail (e.g. part or all of the Cathcart Circle), lines on existing redundant infrastructure (e.g. Great Western Road / Botanic Gardens), new lines (e.g. Clyde Waterfront) and some on-road or next-to-road sections; and/or
- The provision of a new city centre station linking the rail network to the south and east of the city; and/or
- The provision of a new city centre station linking the north and south rail networks.

Both of the new city centre station options would provide additional platform capacity in the city centre and permit cross-city services to be provided. A Metro/Light Rapid Transit system could include new stations, improved service frequencies and improved access to and across central Glasgow. The system would be rolled out on a phased basis.

²⁷ General Register Office for Scotland Mid-2006 population estimates for administrative areas: www.gro-scotland.gov.uk

²⁸ General Register Office for Scotland Mid-2004 population estimates for town/city populations: www.gro-scotland.gov.uk

Public Transport

- 3.106 Using existing infrastructure and with current service patterns, rail access journey times are not expected to change significantly for most of the major centres, although crowding will worsen during peak times. While bus operators can react to changing demand by changing service patterns, routes and / or fare structures, this is typically less possible for rail. The existing investment plans already effectively exploit the most readily deliverable opportunities to increase rail capacity. Any further action to provide for increased demand and encourage modal transfer for journeys to work in the major centres is therefore likely to imply a major 'step-change' in the rail infrastructure and service patterns in order to accommodate increased train services.
- 3.107 Although physical integration of bus / rail and rail / rail is hampered in some places by physical separation of terminals (e.g. in Glasgow with the separation between the two rail terminals and both with the main bus station), integrated ticketing is increasingly available in the major centres. There are opportunities to extend this integrated ticketing facility to a wider market.

ENSURING THAT SCOTLAND REMAINS AN ATTRACTIVE PLACE TO LIVE AND VISIT

- 3.108 Scotland's continued growth is reliant on a number of factors; from having a well educated and healthy population to providing a setting supportive of business and industry. Scotland must safeguard its environment and support global action on climate change while ensuring that prosperity and opportunities are distributed equitably across the nation.
- 3.109 The strategic road and rail networks are crucial in contributing to many of these factors. Whilst they perform relatively well in most situations, there are problems to be addressed. The evidence base and modelling work have highlighted issues likely to affect the strategic corridors, nodes and networks between 2012 and 2022. The STPR has used these to identify a series of interventions designed to maintain, optimise and enhance these networks and thereby support the Scottish Government's Purpose over that time period.
- 3.110 In taking forward the design, development and delivery of these interventions, there is an opportunity to improve access for people and freight, reduce travel constraints, improve safety and alter mode choice and trip patterns to support climate change and environmental protection.
- 3.111 The delivery of the interventions outlined will take time and it is important that the actions taken are focused on meeting strategic priorities. Each intervention will support the Scottish Government's Purpose, address the issues which have been identified and contribute to creating a more successful country.

4 ADDRESSING THE ISSUES: STPR RECOMMENDATIONS

IDENTIFYING INVESTMENT PRIORITIES

- 4.1 The analysis of transport provision and issues described in Chapter 3 has led to the identification of a number of strategic transport goals. As a result, the key policy directions which should guide investment priority decisions have also been identified. The interventions identified by the STPR have been assessed both in terms of their effectiveness at addressing these transport goals, and also in terms of the requirement to support the Scottish Government's Purpose and the complementary objectives of the National Transport Strategy⁴ (NTS) and National Planning Framework⁵ (NPF2).
- 4.2 **Strategic movements of people and freight** will be increasingly constrained by congestion. Demand for the transport network across many parts of the Central Belt is forecast to exceed capacity on both the road and rail network, particularly on corridors serving Edinburgh and Glasgow. Elsewhere in the country key nodes on the road network will become increasingly congested, driven particularly by conflicts between strategic and local traffic. Interventions will be required to ensure that the network continues to operate efficiently and safely, through managing demand but also with targeted enhancements at key locations.
- 4.3 Emissions resulting from the forecast growth in private car and road freight demand need to be managed. One component of this management process will be to **encourage transfer of passenger and freight demand to rail**. This will require interventions to improve inter-urban rail journey times, making them more competitive with private car, and also interventions to increase rail capacity where it is likely to be constrained (and hence likely to suppress rail demand), including providing adequate capacity and facilities for rail freight where appropriate.
- 4.4 There is also a requirement to provide **access for all**, particularly those at risk of being isolated, recognising that social exclusion is a problem for both the urban and the rural areas. Approaches to tackling the issues will be substantially different in the two types of area, but will require maintaining safe links to remoter communities, and providing accessible public transport where appropriate.
- 4.5 **Access to ports** is vital in supporting the movement of goods and international trade, and hence economic growth. Where such access is constrained, either through inadequate infrastructure or through congestion, targeted enhancements will be required to ensure that the constraint is kept to a reasonable minimum.
- 4.6 There is a need to provide **access to major employment, service and social centres** wherever they may be. These are well distributed in cities throughout the central area of Scotland and largely concentrated in the main towns in the more rural areas. Of particular relevance is the fact that many of the areas of economic activity identified are located on the periphery of the cities, where access by public transport is less competitive – implying some requirement for enhancement to the public transport networks and interchange facilities in these cities.
- 4.7 In order to **ensure that Scotland remains an attractive place to live and visit**, there is a continuous need to provide a safe, high-quality transport network.

PRIORITISING TRANSPORT INTERVENTIONS

- 4.8 To shape the interventions identified in the STPR into a realistic, deliverable package, a number of factors must be considered. These include assessing the role of each in contributing to the Scottish Government's Purpose, and considering the limits potentially imposed by resource levels, legislative processes or other factors.
- 4.9 The individual interventions have been appraised using the Scottish Transport Appraisal Guidance (STAG) process in order to assess the extent of their contribution to the Scottish Government's Purpose, as well as to the transport goals described above, and the Scottish Government's Strategic Objectives. They have then been prioritised and categorised as described below.
- 4.10 It must be recognised that it will be neither practical to deliver everything at once; nor possible to deliver everything as quickly as the Scottish Government might wish. The level of available funding alone will be sufficient to shape the programme, whilst some proposals are, by their very nature, reliant on other actions taking place first or more complex in their development and delivery. The impacts of future spending reviews will, therefore, be key in shaping delivery of the STPR.
- 4.11 It is also essential to ensure that interventions are delivered effectively and efficiently and that, collectively, they offer benefits for all communities.

Investment Hierarchy

- 4.12 In development the investment portfolio it is recognised that a hierarchy of actions are necessary to achieve an effective transport network. This hierarchy identifies the nature of the investment, and by implication the likely complexity associated with the development and delivery of the intervention:
- Investment aimed at **maintaining and safely operating existing assets** (ensuring the connections between where people live and work are of a suitable standard and safe);
 - Investment promoting a range of measures, including innovative solutions, to **make better use of existing capacity**, ensuring the existing road and rail networks are fully optimised (these may include technology based, fiscal and 'soft measures' in addition to engineering solutions); and
 - Investment involving **targeted infrastructure improvements**.
- 4.13 In view of the constraints in terms of funding and resources, interventions involving infrastructure improvements have not been taken forward in the STPR without first considering the requirement for, and effectiveness of, interventions in the first two categories. The identified package of interventions has been categorised and presented in this Summary Report according to this investment hierarchy.

Assessing Contribution to the Scottish Government's Purpose

- 4.14 In spite of the constraints, the interventions identified by the STPR offers a significant improvement to the existing transport network and support of Scotland's continued economic growth. The contributory elements of the Scottish Government's Purpose may be addressed to varying degrees and in different ways by different interventions. Improving sustainable economic growth requires the considering of environmental, safety and social cohesion issues in addition to the economic aspects of the Scottish Government's Purpose.
- 4.15 The STPR appraisal process for the interventions has therefore assessed the extent to which they will impact on the Scottish Government's Strategic Objectives of creating a society which is wealthier and fairer, healthier, safer and stronger, smarter, and greener.
- 4.16 It should be noted that the role of the potential interventions has been considered on the basis of their performance in respect of specific objectives for each corridor, node or network. It is not necessarily possible, therefore, to equate the results from an appraisal relating to interventions at one location, for instance, with an appraisal of potential interventions at another location.

Wealthier and Fairer Scotland

- 4.17 Quantifying the link between transport investment and economic growth is highly complex. The transport sector (i.e. logistics, haulage and rail, air and ferry services) contributes directly to the Scottish economy and, like any other sector, changes in employment and output will have impacts on the rest of the economy, both directly and indirectly. More widely, improvements in transport provision (i.e. the ability to travel from A to B) will generate savings for businesses and individual travellers, leading to improvements in economic welfare.
- 4.18 The benefits of the package of schemes recommended by the STPR have therefore been estimated using the approach of identifying impacts on cost savings associated with travel. These savings include making journey times faster and more reliable and improving connections to help build and sustain economic growth; as well as providing travel opportunities for employment, business, leisure and tourism and linking towns, cities and rural communities throughout Scotland.
- 4.19 The benefit-to-cost (BCR) for those schemes where a figure can be provided at this stage indicates that the overall package has a BCR of between 1 and 2, representing good value for money when considering the major focus on public transport investment included in the package.
- 4.20 Unlike many other sectors, transport has additional economic benefits by impacting on the productivity of the economy as a whole. This is known as economies of agglomeration, which describe the productivity benefits that some firms derive from being located close to others. Significant agglomeration economies are expected to be realised from the investment programme identified.

Smarter Scotland

- 4.21 In general, transport interventions such as those included in the STPR are not likely to have a major impact on the Strategic Objective for a smarter Scotland. However, promoting innovation and encouraging implementation of new transport technologies (such as alternative fuels) can help to meet the challenges associated with a greener Scotland and contribute to Scotland's economic growth. The STPR interventions have been assessed on this basis.

Healthier Scotland

- 4.22 Transport interventions can help towards the Objective for a healthier Scotland particularly at a local level, both by encouraging a shift from car to public transport and to healthier and physically active forms of transport, and by improving transport access (public and private) to health and community services. The effects of the STPR interventions tend to be relatively marginal in respect of the Objective, but some schemes are assessed as having a small beneficial effect. The feedback received from the consultation process has highlighted the need safeguard or provide walking and cycling routes, where appropriate, as part of wider scheme development.

Safer and Stronger Scotland




- 4.23 The transport priorities for a safer and stronger Scotland include improving the quality, accessibility and affordability of public transport to provide access to essential services and economic opportunities, including support for communities in less accessible or remote parts of Scotland. In addition, the reduction of accidents is prioritised, through improvement of the condition of roads infrastructure, by investing in new technologies to increase safety and security, and by promoting road safety and driver education.
- 4.24 Making Scotland's roads safer will make an important contribution to this Strategic Objective, as well as the STPR objective to promote continuing reduction in accident rates and severity rates across the strategic transport network. This will support the Scottish Government's Purpose by increasing the attractiveness of Scotland as a place to live and work, hence attracting high quality businesses and skilled migrants, reducing out-migration and securing the productive engagement of an even higher proportion of the population. The STPR investment hierarchy (see above) highlights the need for investment aimed at "maintaining and safely operating existing assets". A number of the interventions in the package identified by the STPR are targeted specifically at safety issues.

Greener Scotland

- 4.25 The challenges associated with climate change and the Objective for a greener Scotland have already been considered in some detail. As noted above, the type of initiative within the scope of the STPR are unlikely to have a major impact on emissions either one way or the other, and other initiatives involving Planning processes and technological and behavioural change will be required for any significant changes to be effected.
- 4.26 However, reducing transport emissions to tackle this issue of climate change and air quality can be addressed to some extent by promoting public transport as well as by encouraging the adoption of new low carbon technologies and promoting cleaner vehicles. In the context of the STPR, the recommended investment package seeks to address this challenge as far as practicable by focusing where appropriate on public transport investment in order to provide attractive alternatives to the private car. Although the overall effect of the package of interventions may be small, it is estimated to be beneficial.

Assessment of Intervention Impacts

4.27 The extent of each intervention’s contribution to each of the Scottish Government’s Strategic Objectives has been assessed as part of the appraisal process. Results are presented in this Summary Report (in Annex A) in terms of the following scale:

-  Beneficial impact
-  Neutral
-  Negative impact

Prioritisation

4.28 In terms of the benefits delivered compared to the cost of implementation, it would generally be expected that the first tier of the investment hierarchy (“maintenance” interventions) would be prioritised ahead of the interventions aimed at “making better use of existing capacity”, and that both of these investment types would be considered ahead of the “targeted infrastructure improvements”.

4.29 However, there are important factors which will need to be taken into account by the Scottish Government – including **affordability**, **climate change** and **environment** – before the delivery and timing of the individual schemes can be agreed and confirmed. The relative significance of these factors, and the manner in which they are assessed, will in turn depend on a number of interdependencies covering both policy and physical considerations.

4.30 A number of the interventions recommended by the STPR have already been prioritised and committed by the Scottish Government.

4.31 Future changes to the financial situation and to policy priorities over the lifetime of the programme could lead to changed priorities for the other STPR interventions, and may imply a requirement to review the scheme priorities over time.

IMPLEMENTATION

4.32 The implementation of the interventions outlined in the STPR will be challenging. Together, they comprise a substantial and ambitious programme, whose delivery will require appropriate resources to be in place in order to pass through the various stages of development, design and delivery:

- Detailed planning;
- The obtaining of statutory approvals;
- Adequate funding; and
- Availability of the skills necessary to design and deliver the interventions.

These requirements are discussed in the sections below.

- 4.33 It should be recognised that securing these resources, progressing through the planning system and delivering a package of interventions of this scale is not a simple process. While all of the interventions identified in this report are expected to make progress through the various stages involved, it is likely that the limited availability of resources coupled with changing priorities over time will mean that not all of the interventions will be fully delivered within the ten-year STPR planning period. Some interventions may take longer to develop or design or to secure the necessary resources, while other interventions have various phases proposed, so may be partially implemented with subsequent phases delivered at a later date (e.g. awaiting evaluation and review of the initial phases).
- 4.34 On the other hand, there will be some interventions where early delivery is required. Preparations for bringing forward the appropriate interventions should be undertaken at the earliest opportunity, thereby reducing the lead-in time and making the best use of available resources.

Detailed planning

- 4.35 Many of the interventions identified require further refinement to resolve outstanding issues of detail and ensure they conform to the appropriate standards for such proposals. Resolution of environmental and engineering issues will be important in this context. While the STPR has undertaken a strategic environmental assessment, more detailed environmental analysis will be needed for some of the interventions. Similarly, more detailed design of road or rail projects will be required to bring them to the point they can be built.

Approvals

- 4.36 Resolution of statutory processes is a common source of delay in the delivery of interventions. There are many requirements in terms of the legislative framework associated with transport interventions, and these vary depending on the type of proposal under consideration. Road proposals have distinctly different statutory frameworks from those of rail proposals for instance and the time taken to conclude the preparation of Roads Orders, Compulsory Purchase Orders or other processes can be considerable.
- 4.37 There is also a clear need to conduct appropriate consultation in support of many proposals. This is a valuable component of scheme development. It can be time consuming, however, and the programme for any intervention encompassing consultation needs to make allowance for this.

Funding

- 4.38 Availability of funding for the scheme is clearly crucial before it can proceed. In practice, the affordability of the individual interventions, and the total budget available, will be the key factor in determining the duration of the implementation programme and scheme prioritisation.
- 4.39 It is typically more helpful to have clarity on long term funding availability when undertaking a long term delivery programme such as that developed for STPR. In reality, the availability of funding over many years cannot often be predicted with accuracy and some degree of flexibility in the timing or prioritisation of interventions will always be necessary.

- 4.40 Nevertheless, in order to make significant progress in delivering the programme of interventions outlined by the STPR, a prolonged and sustained source of funding will be necessary.

Delivery

- 4.41 The construction or implementation of an intervention is often the most visible aspect of its delivery. It has its own challenges and detailed planning and effective management are essential to ensure that adverse impacts, such as disruption during construction, are minimised.
- 4.42 It is also important that interventions are managed to provide timely delivery of the benefits, and that they are phased in the most cost effective and operationally beneficial manner. The latter may be particularly true of rail interventions, where timetabling enhancements and other service improvements in one part of the country must be tied to signalling or station improvements in other parts of the country.

Policy Interdependencies

- 4.43 Affordability of the schemes needs to be assessed taking into account the country's financial situation and the availability of Scottish Government funds. For some schemes, there may be opportunities to draw on other budgets (e.g. working in partnership with Local Authorities and the Regional Transport Partnerships) or to seek investment through public transport providers who would benefit from the scheme. In these cases, the relative affordability of that scheme could be improved.
- 4.44 The assessment of schemes and environment priorities will be influenced by the National Planning Framework (NPF2 in the first instance) and by Development Plans, and by subsequent revisions to these policies as they arise. Some schemes may be particularly important to or supportive of the Planning Framework as it changes and develops, while others will be less so.
- 4.45 Climate change effects of the schemes will need to be considered in the light of the targets and framework established through the proposed Scottish Climate Change Bill.

Physical Interdependencies

- 4.46 The scheme programme will of course be affected by physical interdependencies between the schemes themselves. There are a number of identified schemes which will rely on another of the schemes having already been implemented, or where there is a significant level of synergy. Specific scheme interdependencies are highlighted in the scheme descriptions in Annex A.
- 4.47 In addition, some schemes may be affected by other schemes outside the scope of the STPR (e.g. local schemes or UK schemes) – either being made more significant through synergy between the schemes, or possibly having its priority reduced because of some level of conflict or overlap between the schemes.

MONITORING AND EVALUATION

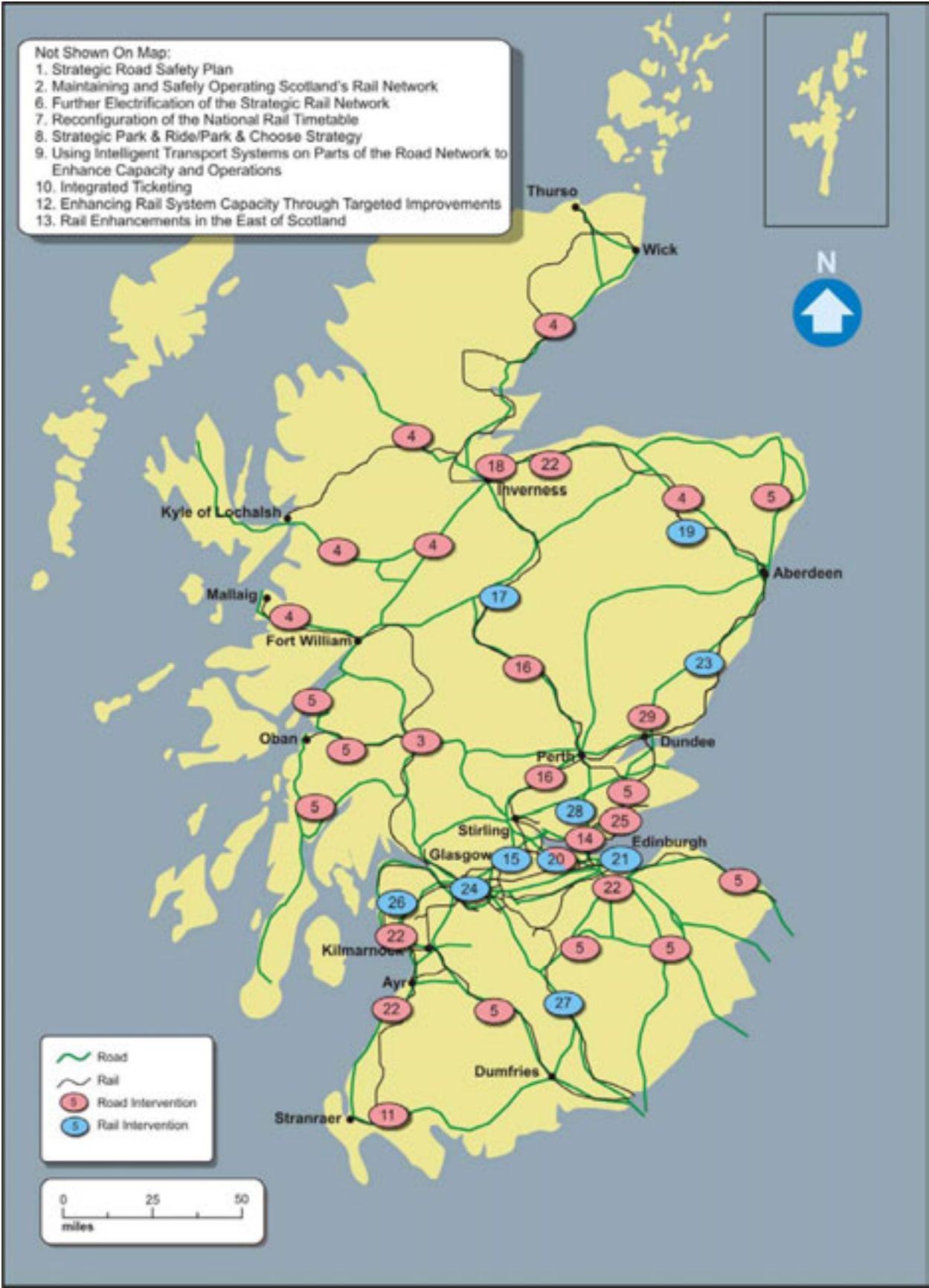
- 4.48 Future priorities will be determined and assessed according to the success of prior STPR schemes in terms of the extent to which they are achieving their objectives. By monitoring a scheme's implementation and evaluating its impacts, lessons can be learnt in terms of preferred approaches and prioritised objectives for future schemes.
- 4.49 Monitoring the implementation process is an important and necessary tool. It will allow the Scottish Government to make best use of its resources in the long term, allowing adjustments to both programmes and funding, whilst keeping the long-term objectives of the STPR in place. The monitoring process will illustrate the ongoing progress against the core objectives and the Scottish Government's Purpose.
- 4.50 Monitoring has a clear role in informing the development of the STPR. It is a requirement of the SEA legislation that the significant environmental effects of the STPR be monitored, both to identify any unforeseen adverse effects at an early stage and to allow appropriate remedial action to be undertaken. Logically, the process of monitoring must be linked to the various stages in the implementation of the STPR and the impacts of monitoring must affect how these stages proceed.
- 4.51 For the purpose of this SEA, monitoring has been based on the strategic mitigation commitments set out in the ER and refined in Section 5 of the Post Adoption Statement. The mitigation objectives and principles will run throughout the implementation of the STPR. Periodic monitoring will examine whether the mitigation measures have been, for example;
- Incorporated into the initial design of the scheme and encompassed within the EIA for the purpose of gaining consent.
 - Translated into contract documents and incorporated into detailed designs.
 - Used to monitor performance during construction and, where necessary, following the opening or implementation of the intervention.
- 4.52 The indicators listed in the Post Adoption Statement provide a general checklist of issues which would be covered in monitoring. These indicators will be added to or adapted as required. It is also recognised that as the scheme develops some mitigation measures may not be applicable or indeed, other measures may be identified.
- 4.53 Measuring the success of the schemes once implemented is essential for a number of reasons, based on the delivery of best value, the safe and effective use of the transport network and the identification and application of best practice. There are two issues of particular importance in this respect;
- Does the intervention actually do what it's supposed to in terms of the original objectives set for it?
 - To what extent had the intervention helped to deliver the Scottish Government's Purpose?

- 4.54 There are issues associated with softer interventions where monitoring will be particularly difficult. Many of these interventions relate to the promotion or facilitation of services. In these cases, it is often possible to measure headline outcomes, but not relate these to underlying factors. Changes in ticketing arrangements may, for instance, be measured in terms of the numbers of tickets sold, but not necessarily in terms of the detail of the trips for which they have been used.
- 4.55 The process of monitoring the STPR is complicated by the longer term, incremental nature of the STPR's delivery. The interventions proposed are, irrespective of their overall programme of delivery, likely to contribute to a step change in the functional characteristics of many parts of the strategic road and rail networks.
- 4.56 Many interventions are substantial undertakings in their own right and collectively, they represent an enormous investment in the future of the country's strategic transport system. It is natural that their delivery will constitute a programme occupying a significant period beyond our current investment programme.
- 4.57 The interventions recommended in the STPR are appropriate for consideration over a prolonged period. It is not expected that significant changes to the recommendations outlined will be forthcoming in the short to medium term. It is recognised, however, that the process of monitoring the STPR's outcomes must allow for refinement and update as we measure progress towards the objectives defined.
- 4.58 We must also recognise that the interventions emerging from the STPR will be delivered in an evolving context and part of the role of monitoring will lie in ensuring that the detail supporting the delivery of the interventions remains current against this changing background. The cyclical updating of the National Planning Framework (NPF) may, for instance, influence the monitoring periods for STPR. Equally, the completion of significant projects, such as the Forth Replacement Crossing, may in itself, drive some aspects of monitoring and evaluation.
- 4.59 Consequently, it is proposed that the monitoring and evaluation of the delivery of the interventions in the STPR will, to an extent, be driven by wider policy considerations, including the periodic refinement of strategies such as the National Planning Framework or the National Transport Strategy. It will be necessary to ensure that the STPR continues to support these, and the Scottish Government's Purpose.

RECOMMENDED INTERVENTIONS

- 4.60 The list of interventions assessed in the STPR and found to make a positive contribution towards the Scottish Government's Purpose and Objectives in the context of strategic transport provision is shown in the map and the table below. The table shows how the interventions have been categorised by investment type using the definitions above. Although the individual interventions have been numbered sequentially (from 1 to 29), it should be noted that this is **not** indicative of a suggested prioritisation: the numbering is simply used as a convenient labelling mechanism between the table, the map and the summary descriptions.

- 4.61 A full set of summary descriptions for the individual interventions shown in the table can be found in Annex A of this report. Each of these summaries describes what the proposed intervention is and where it is. It also describes what the intervention achieves in terms of meeting STPR transport objectives and the Scottish Government's Strategic Objectives (based on the STAG appraisal process) – i.e. by implication, the contribution that the intervention makes towards achieving the Scottish Government's Purpose and National Outcomes.
- 4.62 The intervention summaries also provide additional details relating to each intervention, including;
- Outline details of links to other strategies or agencies;
 - Overview of the current stage of development of the intervention;
 - Suggestion of what the intervention might cost in range terms;
 - Comments on the deliverability of the intervention.
- 4.63 Please note all costs quoted, unless otherwise indicated, are total costs for the entire improvement package and are indicative estimates only based on similar projects quoted in 2008 prices. These exclude VAT and projected costs at point of completion. Depending on future investment decisions, further detailed design and development work would provide a more informed cost estimate. The costs quoted here are offered as an indicative guide only.



Maintain and safely operate existing assets	Make better use of existing capacity	Targeted infrastructure improvements
<ol style="list-style-type: none"> 1. Strategic Road Safety Plan 2. Maintaining and Safely Operating Scotland's Rail Network 3. Targeted Programme of Measures to improve road standards between Glasgow and Oban/Fort William (A82) 4. Targeted Programme of Measures to Reduce Accident Severity in North and West Scotland 5. Route Management on other road corridors 	<ol style="list-style-type: none"> 6. Further Electrification of the Strategic Rail Network 7. Reconfiguration of the National Rail Timetable 8. Strategic Park & Ride/Park & Choose Strategy 9. Using Intelligent Transport Systems (ITS) on Parts of the Road Network to Enhance Capacity and Operations 10. Integrated Ticketing 11. Implement Targeted Programme of Measures to improve links to the Loch Ryan port facilities from the Trans European Network 12. Enhancing Rail System Capacity through Targeted Improvements 13. Rail Enhancements in the East of Scotland 	<ol style="list-style-type: none"> 14. Forth Replacement Crossing 15. Edinburgh to Glasgow (Rail) Improvements Programme 16. A9 upgrading from Dunblane to Inverness 17. Rail Enhancements on the Highland Main Line between Perth and Inverness 18. Upgrade A96 to Dual Carriageway between Inverness and Nairn 19. Rail Service Enhancements between Aberdeen and Inverness 20. Grangemouth Road and Rail Access Upgrades 21. Upgrade Edinburgh Haymarket Public Transport Interchange. 22. Targeted Road Congestion /Environmental Relief Schemes 23. Rail Enhancements between Aberdeen and the Central Belt 24. West of Scotland Strategic Rail Enhancements 25. Light Rapid Transit connections between Fife and Edinburgh 26. Rail Enhancements between Inverclyde / Ayrshire and Glasgow 27. Enhancements to Rail freight between Glasgow and the Border via West Coast Main Line 28. Inverkeithing to Halbeath Rail Line 29. Dundee Northern Relief Road

ANNEXES

A SUMMARY OF DRAFT INVESTMENTS

1 – STRATEGIC ROAD SAFETY PLAN

Intervention description

- A.1 The Scottish Government is prioritising road safety through Scotland’s Road Safety Framework which includes continued commitments for funding Road Safety Scotland and the Safety Camera Programme. A strategic direction to road safety on the trunk road network has been developed. A strategic direction to road safety has been developed through Transport Scotland’s recently published ten year Strategic Road Safety Plan²⁹. In addition, the Scottish Government has published its Road Safety Strategy.
- A.2 This intervention relates to a key objective of the Strategic Transport Projects Review (STPR) which is to continue the development and delivery of the Strategic Road Safety Plan through the period 2012-2022. Building on this, the relevant proposed measures would be implemented on the strategic road network in order to reduce the rate and severity of road accidents on Scotland’s trunk roads.

Contribution towards the Scottish Government’s Purpose

- A.3 The intervention is specifically aimed at reducing accident rates and achieving the national targets for casualty reductions in the UK. Historic targets envisage, by 2010, a 40 per cent reduction in the number of people killed or seriously injured, a 50 per cent reduction in child deaths and serious injuries, when compared with the 1994-8 average, and a 10 per cent reduction in the slight casualty rate.
- A.4 The Scottish Road Safety Strategy has updated these to set targets for a 40 per cent reduction in the numbers of people killed and a 55 per cent reduction in the numbers seriously injured by 2020, compared to the average for 2004-08. The targets for reducing deaths or serious injuries to children over the same time have been altered to 50 per cent and 65 per cent respectively. The 10 per cent reduction in slight injury accidents is retained.
- A.5 Making Scotland’s roads safer will make an important contribution to the Scottish Government’s Key Objective for a Safer and Stronger Scotland and the STPR objective to promote continuing reduction in accident rates and severity rates across the strategic transport network, recognising the need to continue the work of the Strategic Road Safety Plan through the STPR period. This will support the Scottish Government’s Purpose by increasing the attractiveness of Scotland as a place to live and work, hence attracting high quality businesses and talented migrants, reducing out-migration and securing the productive engagement of an even higher proportion of the population. The Strategic Road Safety Plan therefore provides the framework for the various interventions identified in this report to address these specific STPR objectives.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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²⁹ Strategic Road Safety Plan, Transport Scotland, November 2007

Links to Other Strategies

A.6 This intervention links to the Road Safety Strategy and the Road Asset Management Plan³⁰.



Current Status of Project

A.7 The Strategic Road Safety Plan has recently been published, and is widely supported. This intervention continues the development and delivery of the Strategic Road Safety Plan through the period 2012-2022.

Indicative Costs

A.8 The anticipated cost of helping to deliver the Strategic Road Safety Plan is between £10m and £50m over the course of the STPR period.

Deliverability

A.9 The deliverability of the intervention is considered technically and operationally feasible. Although some new and untried technologies may be put forward for implementation as a result of research and development of new techniques, the Strategic Road Safety Plan promotes a structured approach to adopting these techniques, making use of Demonstration Road Safety Projects and knowledge sharing. This approach would be likely to minimise any risks associated with the implementation of new techniques. The collation of road safety statistics to inform any updates of the Plan is a well established procedure. It is expected that any data required to inform the updates can be collected without disruptions to the network.

³⁰ Road Asset Management Plan, April 2007- March 2009, Transport Scotland November 2007

2 – MAINTAINING AND SAFELY OPERATING SCOTLAND’S RAIL NETWORK

Intervention description

- A.10 This intervention represents the day-to-day management and maintenance of the rail network, carried out by Network Rail in line with the requirements of the Scottish Ministers. The implementation of the existing maintenance regime is designed to provide effective protection of the asset base.

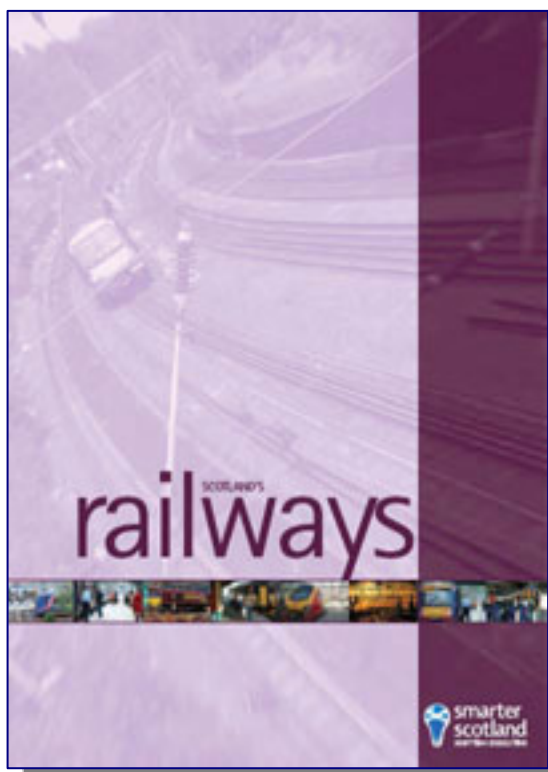
Contribution towards the Scottish Government’s Purpose

- A.11 The total rail assets in Scotland are approximately £5 billion. Network Rail receives more than £300 million of direct grant every year to manage the rail network and to maximise its capacity. The funding allocated to Network Rail is for the operation, maintenance and renewal of the rail infrastructure network. This work links directly to this first level of requirement for the Strategic Transport Projects Review (STPR) in maintaining and safely operating the network.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

- A.12 The ongoing support for the Scottish rail network underlies the various plans for rail improvement schemes outlined in this report, and the role of rail in the National Transport Strategy (NTS), as outlined in ‘Scotland’s Railways’.





Current Status of Project

A.13 This is an ongoing process, which is planned to continue throughout the STPR period. This work links directly to the first level of requirement for STPR in maintaining and safely operating the network.

Indicative Costs

A.14 Network Rail currently receives more than £300 million of direct grant every year to manage the rail network in Scotland and to maximise the potential for making use of the existing capacity. The total intervention will cost £3 billion, however this cost will be funded by the direct grant over ten years.

Deliverability

A.15 There would not be any significant technical or operational impacts on the delivery of this intervention, although much of the work involved in maintaining the network requires disruptive possessions to be taken, closing parts of the rail network while the necessary work is carried out safely.

3 – TARGETED PROGRAMME OF MEASURES TO IMPROVE ROAD STANDARDS BETWEEN GLASGOW AND OBAN/FORT WILLIAM (A82)

Intervention description

- A.16 This intervention supports the objectives to provide a significant improvement in road standard along the A82 and to reduce the accident severity rates on the route. In addition to a general upgrade of the route the intervention would include measures such as:
- Carriageway widening at selected locations between Tarbet and Inverarnan;
 - Carriageway widening at selected locations between Corran Ferry and Fort William; and
 - Physical works such as climbing lanes at Loch Tulla, overtaking lay-bys aimed at providing safer overtaking opportunities and improving journey time reliability and safety targeted measures such as hard strips, junction improvements and local realignment.
- A.17 It is envisaged that individual elements would be delivered in a targeted programme to address identified accident clusters and points where the routes have significant constraints on achieving consistent journey times.
- A.18 In addition, speed enforcement cameras would be considered at appropriate locations.

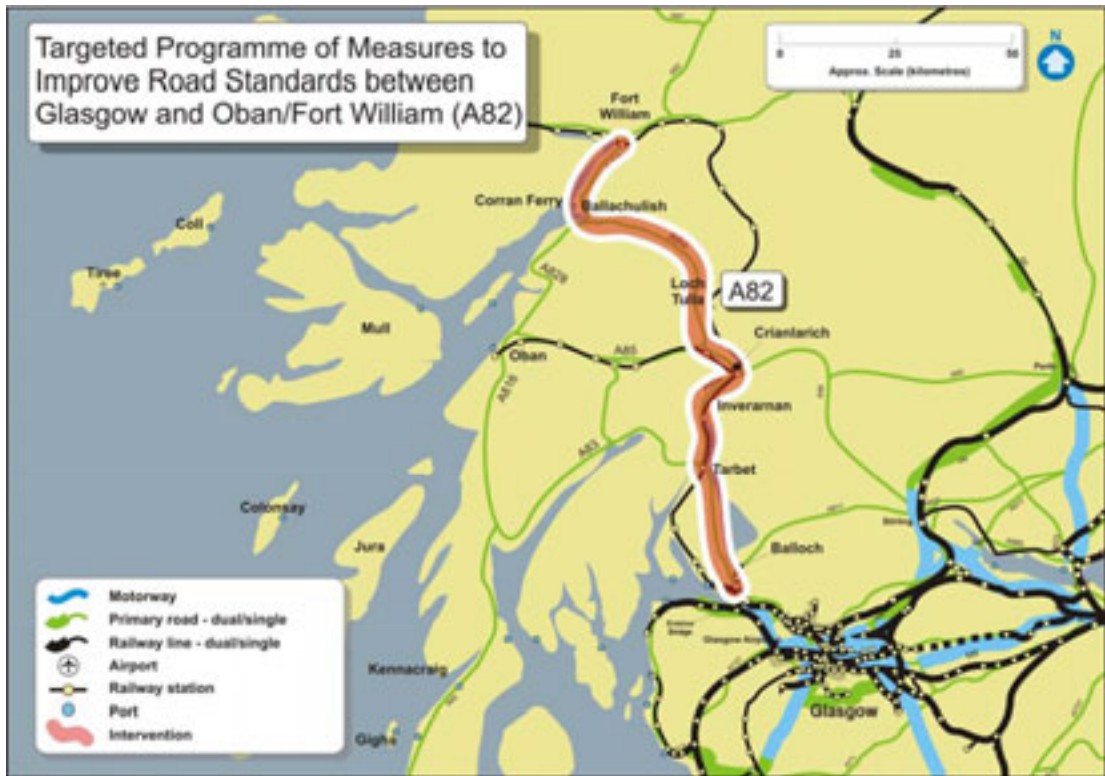
Contribution towards the Scottish Government’s Purpose

- A.19 The introduction of physical works to provide safer overtaking opportunities, in conjunction with speed enforcement measures, is expected to improve road safety along the route, and reduce both the accident and fatal accident rates closer to the national levels.
- A.20 This is a key route for tourism and as such has a high proportion of infrequent users; the provision of a consistently high standard of carriageway would be of particular significance to the improvement of road safety.
- A.21 The combination of these measures on the A82 and other key routes on the corridor would contribute significantly towards the established objectives and significantly improving the accessibility of Argyll and the North West.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

- A.22 This intervention includes a range of safety-related and asset management interventions, as addressed in the Strategic Road Safety Plan and the Road Asset Management Plan.



Current Status of Project

A.23 A Scottish Transport Appraisal Guidance (STAG) appraisal process has already been carried out on the Route Action Plan for the A82³¹, and the elements of the Plans agreed. The Route Action Plan forms the basis for this intervention, which has seen Scottish Government commitments to deliver the Crianlarich Bypass and Pulpit Rock improvements. It is expected that this intervention would be welcomed by regular road users in this area as there has been a degree of public interest in improvements on the A82 for some time.

Indicative Costs

A.24 The total estimated cost of full implementation of this scheme is in the range £100-£250 million.

Deliverability

A.25 The Route Action Plan has already been developed to a high level of readiness, and can be implemented within the relatively short term. Due to the rural nature of much of the corridor, design work would have to take account of the local terrain and various environmental sensitivities. This is particularly important as tourism plays a key role in travel on this corridor and the route itself runs through areas of scenic and ecological value.

A.26 The environmental impacts this intervention has on designated sites, valued habitats, protected species and water quality have been identified at the strategic level as part of the Strategic Environmental Assessment and Appropriate Assessment. Appropriate mitigation and avoidance measures have been identified and will be further refined as this intervention is taken forward.

³¹ A82 Tarbet to Fort William Route Action Plan Study, Transport Scotland, Scott Wilson, 2006

4 – TARGETED PROGRAMME OF MEASURES TO REDUCE ACCIDENT SEVERITY IN NORTH AND WEST SCOTLAND

Intervention description

- A.27 This intervention supports the objective to reduce the fatal and severe accident rates on strategic routes in North and West Scotland. Targeted programmes of measures are required on these corridors, where specific objectives have been identified to address safety related issues.
- A.28 A number of bespoke improvements such as widening, improved alignment and some 2+1 sections are proposed to address identified high severity accident clusters and locations of accident severity along the relevant routes. In addition to the proposed physical works speed enforcement measures could be considered at appropriate locations.
- A.29 The bespoke improvements would include measures such as:
- A9 north of Inverness – Physical works at locations such as Tore Roundabout;
 - A835 between Inverness and Ullapool – Physical works on the A835 aimed at providing safer overtaking opportunities, local realignments and localised widening of the carriageway;
 - A82 / A87 / A830 / A887 between Inverness, Fort William, Mallaig and Skye – Physical works aimed at providing safer overtaking opportunities, hard strip provision for agricultural vehicles, local realignments and junction improvements; and
 - A96 between Aberdeen and Inverness – Physical works aimed at providing safer overtaking opportunities such as: 2+1 sections; climbing lanes and overtaking lay-bys; hard strip provision for agricultural vehicles; local realignments and junction improvements.

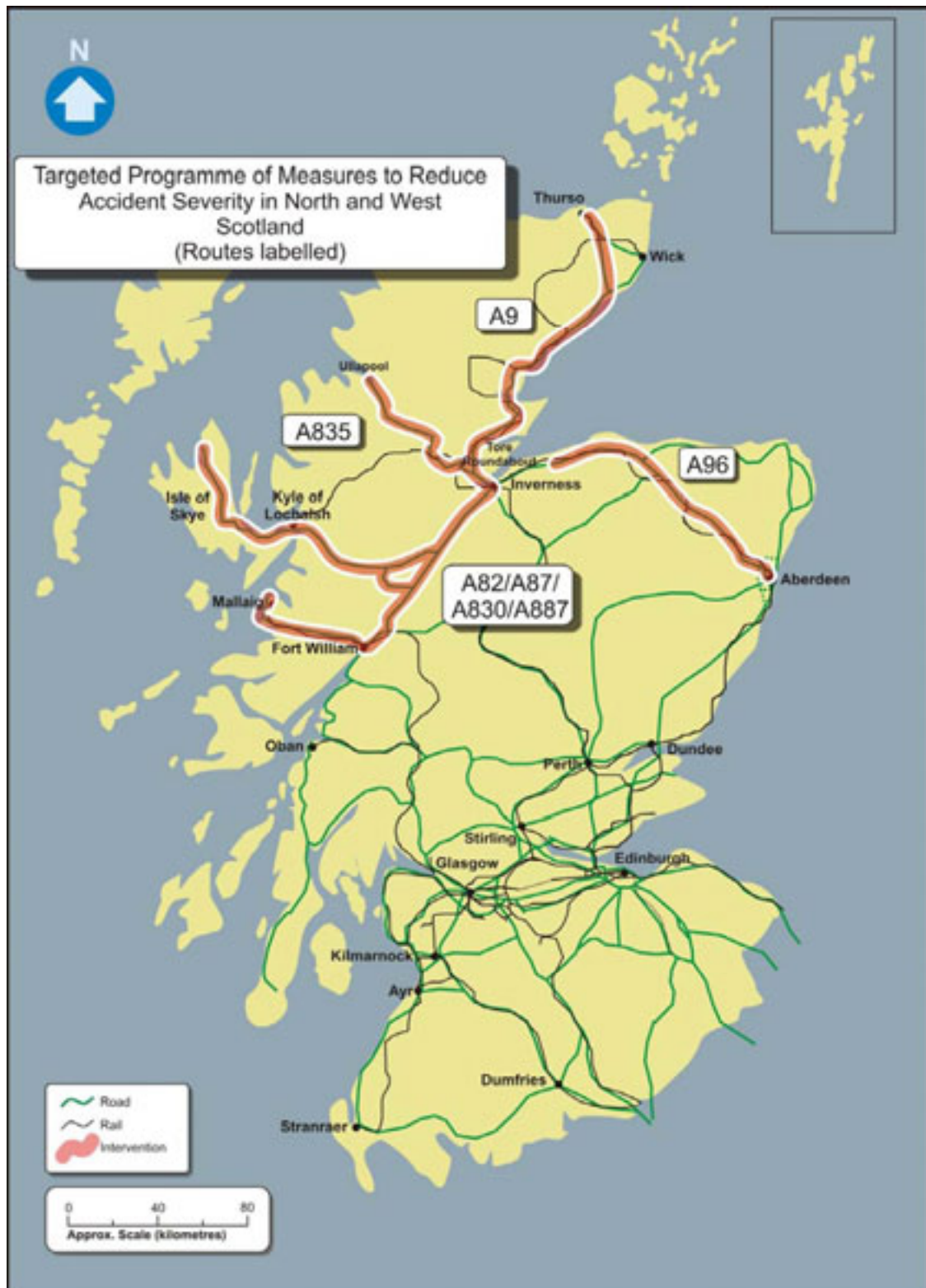
Contribution towards the Scottish Government’s Purpose

- A.30 The local realignments and junction improvements are expected to improve safety. For example, evidence elsewhere suggests that the introduction of climbing lanes can result in a significant reduction in accidents (up to 50 per cent) on single carriageway routes. The introduction of the appropriate speed enforcement measures could also result in the safer operation of the road network, due to a reduction in speeding vehicles. Evidence from trials elsewhere indicate an almost 100 per cent compliance with the speed limit under these systems.
- A.31 It is forecast that through the introduction of these measures, the overall number of accidents and the proportion of serious and fatal accidents will reduce to levels closer to the national rate. This will contribute to the Scottish Government’s Purpose of creating a ‘safer and stronger’ Scotland.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.32 This intervention includes a range of safety-related and asset management schemes, as addressed in the Strategic Road Safety Plan and the Road Asset Management Plan.



Current Status of Project

A.33 Some of the measures required on these routes have been identified in the relevant Route Action Plans and ongoing route management. Some of these measures have already been implemented or are currently committed – others are awaiting approval and / or programming. Improving safety on these routes is likely to be met with a positive public response.

Indicative Costs

A.34 The total estimated cost of full implementation of the above safety schemes is in the range £100-£250 million.

Deliverability

A.35 Much of the work associated with the individual schemes in this intervention has already been developed to a high level. These components, along with the additional safety measures proposed, could be implemented within the short term. Due to the rural nature of many of the corridors final design and implementation work would have to take account of the local terrain and environmental factors when considering deliverability.

5 – ROUTE MANAGEMENT ON OTHER ROAD CORRIDORS

Intervention description

A.36 This includes a series of initiatives to implement road-based improvements with a combination of network optimisation through route management and targeted investment in relatively local interventions. The routes included within this intervention are:

- Aberdeen and North East Scotland (A90);
- Edinburgh and Dundee (A92);
- Ayrshire and Dumfries (A76);
- Edinburgh and North West England (A68/A7/A702);
- Edinburgh and North East England (A1); and
- The A83, A85 and A828.

A.37 These routes generally perform well, and as such no objectives have been established to address corridor specific issues.

A.38 However, there is a need to maintain and safely operate these in the context of a route management strategy. This intervention would include a variety of localised improvements that would be undertaken in tandem, and driven by, the trunk road maintenance contracts. These enhancements would be targeted to bring the physical condition and safety standards of the routes concerned to a level which will support the expected levels of traffic during the period of the review.

Contribution towards the Scottish Government's Purpose

A.39 There are a number of corridors where no strategic issues relating to network performance have been identified, but there is an ongoing need to maintain and safely operate the network. These route management interventions will perform this role.

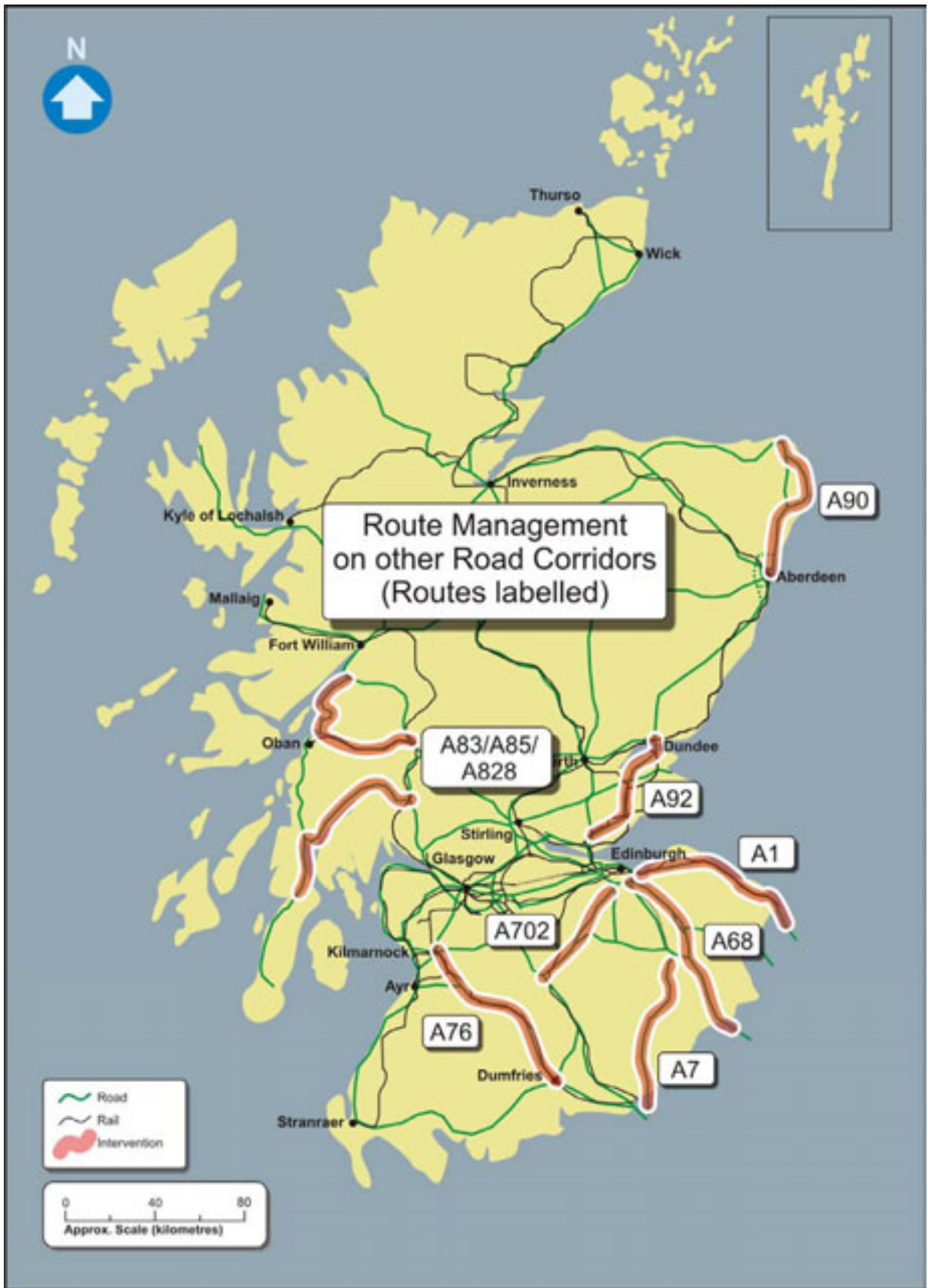
A.40 These interventions will address isolated constraints, and although the immediate benefits would be felt at a more local level, for example through isolated junction improvements, the programme of works would contribute towards the need to maintaining and safely operate the network.

A.41 Reductions in accident numbers would be expected at the improved locations, with up to 50 per cent reduction in certain sections. Severity rates are likely to be reduced by new 2+1 and re-aligned sections.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.42 These Plans include a range of safety-related and asset management interventions, as addressed in the Strategic Road Safety Plan and the Road Asset Management Plan.



Current Status of Project

- A.43 Some of the measures required on these routes have been identified in the relevant Route Action Plans and ongoing route management. Some of these measures have already been implemented or are currently committed – others are awaiting approval and / or programming. Improving safety on these routes is likely to be met with a positive public response.

Indicative Costs

- A.44 The total estimated cost of full implementation of this intervention is in the range £100-£250 million. However, some elements of this intervention are already committed, so the additional cost over current commitments will be lower than this.

Deliverability

- A.45 The deliverability of this intervention is considered technically and operationally feasible. Most of the measures have already been developed to a high level of readiness, and can be implemented within the short term. There are no major technical issues anticipated from this intervention, however design would have to account for conditions along the corridor such as terrain. Any visual impact due to speed enforcement measures would also have to be recognised.

6 – FURTHER ELECTRIFICATION OF THE STRATEGIC RAIL NETWORK

Intervention description

- A.46 This intervention supports the ‘NPF2’ and ‘Scotland’s Railways’ to work towards an electrified rail network across the strategic routes in Scotland. It also contributes to a number of objectives relating to emissions and rail operations.
- A.47 Rail electrification can contribute to emissions reduction by allowing train power to come from more environmentally friendly sources. This has not been assumed in the environmental assessment of the STPR, but none the less, offers potential benefits over the longer period. There are operational benefits compared with diesel powered trains both in terms of reduced journey times and operating costs. It also gives the opportunity for interoperability and more efficient use of rolling stock, particularly in the West of Scotland where running through some stations is restricted to electric rolling stock.
- A.48 It is envisaged that electrification would be delivered on a phased basis. In the short term, this would include:
- Phase 1 - Committed improvements as part of the Edinburgh to Glasgow improvements, comprising Edinburgh to Glasgow via Falkirk route, Diversion Routes 1 (Haymarket) and 2 (Falkirk Grahamston), and electrification on the route via Cumbernauld and to Dunblane / Alloa; and
 - Phase 2 - Electrification of the remaining routes in the Central Belt (Shotts, Whifflet, Paisley Canal, Glasgow North Suburban, East Kilbride and Kilmarnock).
- A.49 In the longer term, extending into the period beyond STPR, this would include:
- Phase 3 - Electrification of routes between Edinburgh, Perth and Dundee including the Fife Circle;
 - Phase 4 - Electrification from Dunblane to Aberdeen; and
 - Phase 5 – Electrification from Perth to Inverness.

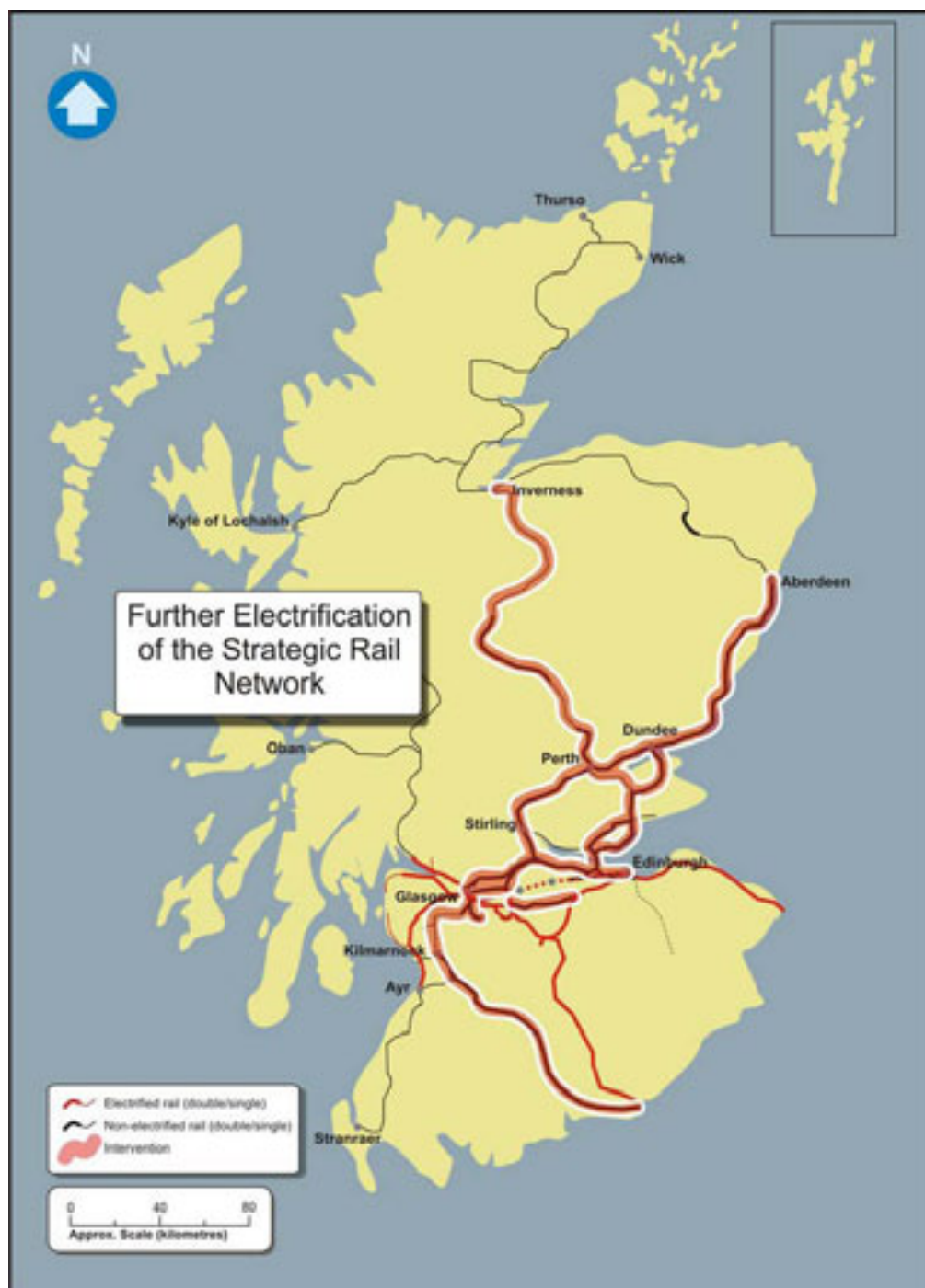
Contribution towards the Scottish Government’s Purpose

- A.50 This intervention supports the Key Strategic Outcome to reduce emissions in pursuit of a Greener Scotland by providing cleaner, more efficient traction for rail services. There are a number of areas where objectives to reduce emissions would be supported by this intervention.
- A.51 Currently 23 per cent of the Scottish rail network is electrified and this intervention would see the expansion of this over the greater part of the network. Electrified services would reduce energy consumption by 15 per cent for inter-urban and 20 per cent for stopping services.
- A.52 This intervention would also allow greater flexibility of operation for services across the network, giving opportunities for new routes and through services. Electrification would support other rail interventions as part of an overall strategy for ‘step-change’ performance across parts of the system, particularly in Fife.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.53 The electrification of routes is likely to be linked to other elements of route modernisation, for example, the upgrading of signalling systems. A strategy of electrification has been highlighted in the National Transport Strategy ('Scotland's Railways' / Freight Action Plan), The Scottish Rail Planning Assessment³², and the Network Rail Scottish Route Utilisation Strategy³³.



³² Scottish Planning Assessment, Transport Scotland, Arup Consultants, 2005

³³ Scotland Route Utilisation Strategy, Network Rail, March 2007

Current Status of Project

A.54 Network electrification is included in the Scottish Ministers' High Level Output Statement³⁴ for rail services (Summer 2007) as a 'Tier 3' intervention. Electrification of the Edinburgh to Glasgow route and associated connecting links was included in a Ministerial Statement on 27 Sep 2007. The electrification of the route between Glasgow and Edinburgh has been planned to Guide to Railway Investment Programme level 1. No other interventions have been developed at this stage. The intervention to electrify Scotland's rail network has been in the public domain for some time now through Scotland's Railways. It is generally accepted that this intervention would provide a number of positive benefits to the general public in terms of faster journey times and a reduction in emissions.

Indicative Costs

A.55 There are significant costs associated with implementing electrification. As well as the overhead cabling system, modifications to structures such as bridges and tunnels are often required to accommodate the increased clearance required.

A.56 The estimated costs of the proposed phased electrification plan are expected to be in the range £250m to £500m for each of the five phases.

Deliverability

A.57 The technologies for electrification already exist, and there are no major technical barriers to implementation. There would be an impact on the operation of existing rail services during the electrification of these routes. While some of the work could be carried out during normal maintenance possessions and during the night, it is likely that there will be some significant work required which would require longer closures. These could be mitigated through diverting over other routes where possible, but there could still be some disruption for existing rail users.

³⁴ Scottish Ministers' High Level Output Specification , Scottish Ministers' July 2009

7 – RECONFIGURATION OF THE NATIONAL RAIL TIMETABLE

Intervention description

- A.58 Several objectives have been identified to reduce journey times by public transport, particularly between Aberdeen/Inverness and the Central Belt. At present, the Scottish Rail Network has no significant service hierarchy, with many services performing multiple roles in linking cities and intermediate stops, resulting in some cases of uncompetitive journey times.
- A.59 This intervention would address these issues by re-casting the rail service timetable to provide fast, limited-stop trains which would serve longer distance journeys between the cities and replace some of the existing semi-fast services. Intermediate destinations would be catered for by stopping services. This is in line with the purpose of the rail network as defined in Scotland's Railways. It is likely that this intervention would be undertaken on a phased basis, in conjunction with other interventions, particularly any programme of network-wide minor improvements.
- A.60 There would, of course, be a requirement to ensure that an adequate number of semi-fast or stopping services remained in place for the intermediate locations. These may be supplemented by additional local bus services. This intervention is predicted on the basis of no requirement for new infrastructure or rolling stock.

Contribution towards the Scottish Government's Purpose

- A.61 This intervention supports the objective to reduce inter-urban journey times on public transport by reducing journey times between Aberdeen/Inverness and the Central Belt by up to 20 minutes. Forecasts show a relatively small overall increase in rail passengers, however, the majority of this increase is related to a transfer from longer distance car traffic, resulting in reduced emissions from road based vehicles. While the benefits in terms of growth in passenger-kilometres are relatively modest, there are significant benefits to those already using the services through a reduction in journey time, for example a reduction of around 20 minutes to journeys between Aberdeen/Inverness and the Central Belt.
- A.62 The costs of providing this intervention are low with the largest benefits accruing to longer distance travellers. However, there could be an adverse impact on shorter distance trips that currently use main line services, although these could be addressed through the provision of local bus services.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

- A.63 Although this intervention is itself assumed not to require any additional rolling stock or infrastructure, there are clear synergies and interaction with other proposed interventions involving targeted enhancements which tend to build on this strategy. These other proposals allow for additional service frequency as well as the faster services proposed here, but at the cost of additional rolling stock and infrastructure works. Examples include the proposals to introduce additional services between the main centres on a number of routes as well as proposals to enhance cross-city and suburban train services.



Current Status of Project

A.64 The timetable recast is in the early stages of feasibility planning. It is expected that this intervention would be supported; however any decrease in the level of service at any station could face some local opposition.

Indicative Costs

A.65 It is possible that some minor infrastructure enhancements may be required to enable the mix of fast and stopping services to operate over existing routes and to maintain operational performance standards. However, the estimated overall cost for this intervention is relatively low (less than £10m).

Deliverability

A.66 The delivery of changes to the inter-city timetable is likely to require a significant re-cast of the timetable for the entire Scottish rail network. This may be best delivered as part of the specification for the next rail franchise when it is renewed in 2014, to allow for a competitive approach to the delivery of a compliant, deliverable and cost effective operation. There would not be any significant technical constraints for the delivery of this intervention, although any changes to the timetable would have to be made within the current limitations within the rail network.

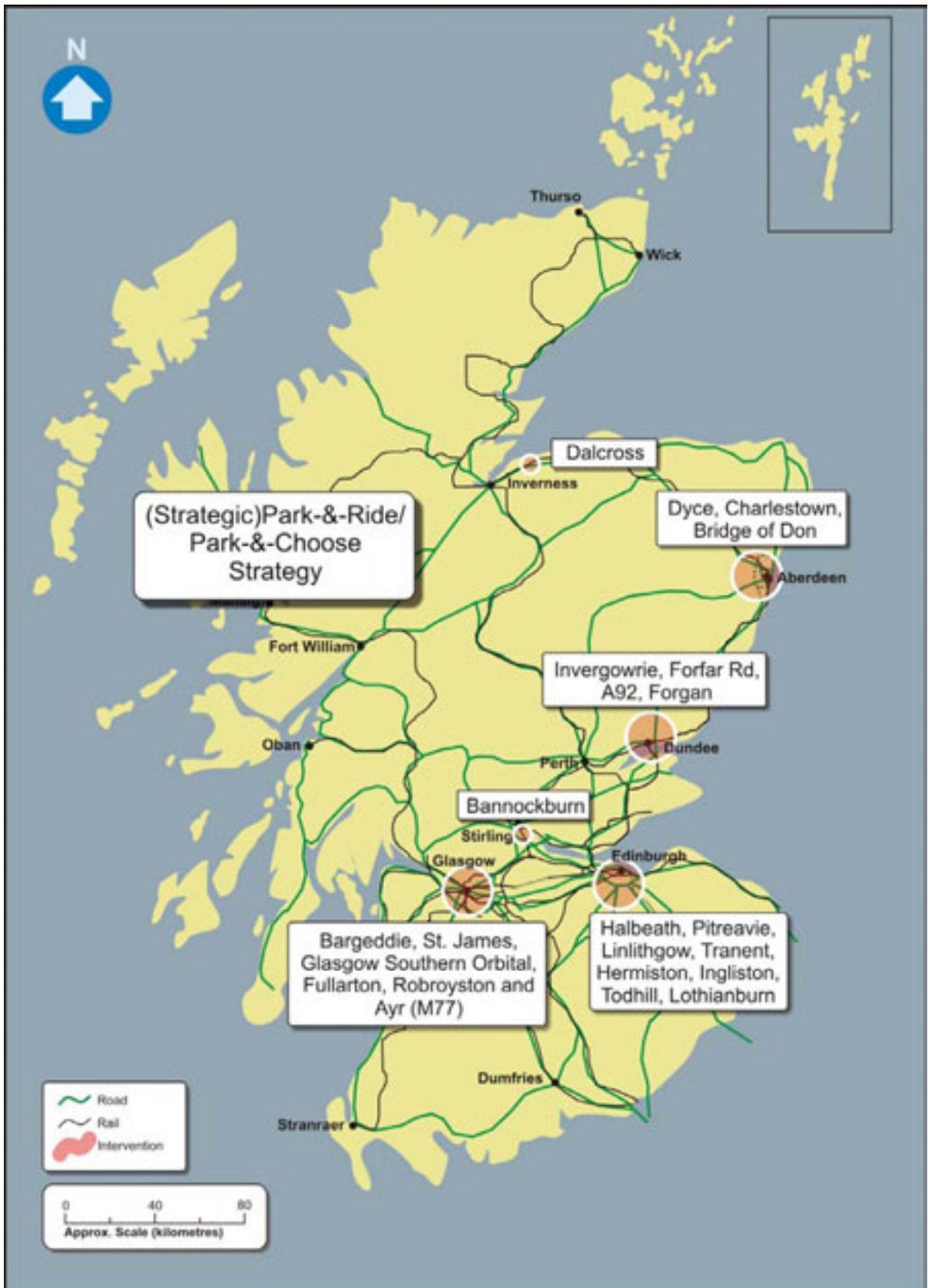
8 – (STRATEGIC) PARK-&-RIDE / PARK-&-CHOOSE STRATEGY

Intervention description

A.67 This intervention supports the objectives to make public transport more competitive against the car. Located on major commuting routes, these sites would also assist in maintaining and enhancing the labour catchment areas in the city regions and reducing emissions. It would deliver a series of strategic Park-&-Ride / Park-&-Choose sites using common branding / marketing across Scotland. The sites would be served by either rail services or express bus links to and from the city centres and areas of economic activity, including appropriate bus priority measures at congested locations. These would interface with existing urban bus priority systems. Proposed sites for this strategy include creation of new facilities:

- Serving Aberdeen: Dyce (A96) and Charleston;
- Serving Dundee: Invergowrie, Forfar Road, A92 and Forgan;
- Serving Edinburgh: Halbeath, Lothianburn , Pitreavie, Linlithgow and Tranent;
- Serving Glasgow: Bargeddie (M8), St James (M8), Glasgow Southern Orbital (M77), Fullarton (M74), Robroyston (M80) and outside Ayr (M77);
- At Bannockburn, serving Edinburgh, Glasgow and Stirling; and
- A new station at Dalcross with Park-&-Ride facilities and interchange facilities with Inverness Airport.

A.68 In addition, this could incorporate expansion and complementary branding at existing sites at Bridge of Don, Hermiston, Ingliston and Todhill (Sheriffhall), with increased frequency for the current bus services from these sites.



Contribution towards the Scottish Government's Purpose

- A.69 This intervention would help to keep the city centres moving by reducing road congestion in the peak periods. It would also assist in maintaining the labour catchment, and reducing emissions. In the case of Edinburgh where this is a key objective the proposed measures would increase the number of people able to access areas of economic activity, particularly central Edinburgh. It is a similar picture for Glasgow where sites are proposed on all major radial roads.
- A.70 This intervention could be taken forward in conjunction with other interventions aimed at providing priority vehicle lanes on sections of the strategic road network (i.e. Using Intelligent Transport Systems (ITS) on Parts of the Road Network to Enhance Capacity and Operations).

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

- A.71 This strategy could be taken forward in conjunction with interventions aimed at providing priority vehicle lanes on sections of the strategic road network. In particular, there are links between this intervention and the proposed Forth Replacement Crossing.
- A.72 The Scottish Government has published a National Framework document for Park and Ride for buses. The aim of this Framework is to assist Authorities and bus operators on approaches to the development of Park & Ride facilities.

Current Status of Project

- A.73 Several Regional Transport Partnerships are bringing forward strategies for Park and Ride facilities and services. The Scottish Government is liaising where appropriate and will continue to do so as part of the development of relevant proposals. Most measures envisaged as part of the intervention have not been presented to the public. However, in general the measures are expected to be supported in principle as they would improve public transport provision, encourage mode shift and reduce congestion along busy commuter routes.

Indicative Costs

- A.74 The total cost of this intervention is estimated to be in the range of £50 - £100 million.

Deliverability

- A.75 Deliverability of the bus priority measures will depend on the ability to develop appropriate interventions which do not restrict the available road capacity for other traffic to an unacceptable extent. It will also be important to define Park-&-Ride interventions which, once implemented, are self-financing and do not need ongoing subsidy for their operating costs. The intervention is considered to be operationally feasible. Patronage levels would require to be sustained in order to operate the intervention over its projected life.

9 – USING INTELLIGENT TRANSPORT SYSTEMS (ITS) ON PARTS OF THE ROAD NETWORK TO ENHANCE ROAD CAPACITY AND OPERATIONS

Intervention description

A.76 This intervention supports the objectives of improving journey time reliability and journey times for prioritised users. It would involve the introduction of enhanced Intelligent Transport Systems (ITS), principally Active Traffic Management (ATM), on the motorway and trunk road network in Central Scotland:

- M8;
- M90 and A90 approaching Edinburgh;
- A720 around Edinburgh; and
- M74, M77 and M80 approaching Glasgow.

A.77 Phase 1 would consist of variable speed limits, variable message signs, ramp metering at key junctions and average speed enforcement measures as appropriate. Phase 2 would consist of additional functionality through further provision of ramp metering and hard shoulder running within the existing road space. Phase 3 would consist of improved functionality such as targeted use of the hard shoulder as an additional ‘managed lane’ for priority vehicles – e.g. High-Occupancy Vehicles (HOVs), buses and, Heavy Goods Vehicles. In some cases, road widening could be used to generate an additional lane for this purpose.

Contribution towards the Scottish Government’s Purpose

A.78 The implementation of an Intelligent Transport System (ITS), based on an expansion of the existing capabilities of the Traffic Scotland system, would have significant benefits for the movement of people and goods. This would contribute to objectives on a number of corridors that link into the urban networks of Edinburgh and Glasgow, and in particular would contribute to the objective to improve the operation of the urban Glasgow motorway network.

A.79 This system would also be able to support the operation of the strategic Park-&-Ride / Park-&-Choose intervention by providing opportunities to use the hard shoulder on approach to the urban networks for priority vehicles.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.80 ATM schemes would link to both the Strategic Road Safety Plan and the Road Asset Management Plan. Managed lanes for Heavy Goods Vehicle use link to the Freight Action Plan.



Current Status of Project

A.81 The technology to implement Active Traffic Management (ATM) has been tested and proven elsewhere in the UK, and some parts of the Scottish network have already had significant investment in ITS measures. A preliminary design for the M90 in Fife has been carried out by Fife Council (supported by SEStran), and has been considered in the Forth Replacement Crossing Study. This is an important intervention to the economies of Glasgow, Edinburgh and the Central Belt, with significant public interest at both local and regional levels. Previous experience in implementing these measures and the subsequent improvements show that they are well received.

Indicative Costs

A.82 The M42 pilot scheme cost approximately £5.6 million per kilometre for a full scheme on an existing 3-lane motorway. Based on this, estimated costs for the routes suggested here are in the range £250m - £500m for the Phase 1 schemes, a further £100m - £250m for the Phase 2 schemes and £100m - £250m for Phase 3.

Deliverability

A.83 ATM is deliverable by Transport Scotland on the road network, and the required technology and resources are available. Detailed feasibility analysis will be required to assess the deliverability and effectiveness of each phase of the intervention. This intervention would have moderate environmental benefits by minimising congestion and stationary traffic and safety benefits by reducing the potential for collisions.

A.84 It would be necessary to provide additional control facilities/environment to monitor the network and provide an appropriate level of resilience while supporting an efficient response to incidents i.e. closure of hard shoulder in event of accident, breakdown etc. Monitoring of an actively managed hard shoulder would require post intervention monitoring to assess the effect on emergency services etc.

10 – INTEGRATED TICKETING

Intervention description

- A.85 This intervention involves the development of a national, integrated ticketing system for all modes of public transport and would support the objectives to promote seamless travel, improve the competitiveness of public transport and improve overall perception of public transport. Integrated ticketing is only one aspect of wider integration of transport, but its role in achieving seamless travel is vitally important. It is also important that any ticketing system adopted has a strong legacy value in terms of its ability to be sustained and evolve through time. There may be early opportunities to support the Commonwealth Games in 2014 by integrated ticketing and any system developed to support the games should be considered in terms of the points made above.
- A.86 It is likely that the system would be delivered through Smartcard technology, similar to schemes operating in London and other European cities, but probably using the Integrated Transport Smartcard Organisation standard (ITSO). The card would allow interoperability across different public transport services over all of Scotland, and would provide a robust, secure system for revenue allocation to operators.
- A.87 Such a system would require investment in fixed validation equipment at terminals and on buses/trams, sales facilities and Smartcards, and back office systems to undertake revenue allocation and provide management information. Further detailed consideration will be required to determine the type of product used.

Contribution towards the Scottish Government's Purpose

- A.88 Integrated ticketing is not an end in itself but a means of achieving the wider policy objectives of the Scottish Government.
- A.89 This intervention would provide greater integration and use of public transport as a real alternative to the car, in line with Scottish Government Key Strategic Outcomes. This intervention also offers the potential to reduce boarding times on bus services, since there would be a reduced requirement for drivers to sell tickets. Evidence from the London scheme currently suggests that upwards of 80 per cent of bus journeys in London are now made using a Smartcard; this may be largely due to significant cost savings to the users of the card.
- A.90 From an environmental stand point this intervention is expected to have a small positive impact. However, taken together with other proposed interventions there is the potential to reduce the overall level of emissions by encouraging car drivers to use public transport.
- A.91 This intervention could be taken forward in conjunction with those addressing service enhancements and the provision of Strategic Park-&- Ride / Park-&-Choose facilities.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.92 Integrated ticketing³⁵ has been highlighted in a number of recent strategy documents:

- The Scottish Government Manifesto expresses commitment to bringing together Scotland's transport stakeholders to take forward measures to ensure greater integration of the public transport network and to putting forward for consideration development of an integrated paycard;
- The National Transport Strategy sets out the importance of integrated ticketing;
- The consultation document 'Integrated Ticketing; A Strategy for Scotland' was published in May 2008; and
- The Regional Transport Strategy (RTS) documents also take forward some of these ideas for integrated ticketing in the context of specific requirements for each of the regions – particularly in the context of promoting bus travel.

Current Status of Project

A.93 The Scottish Government is currently consulting on their Integrated Ticketing Strategy for Scotland. The emerging strategy will bring together some of the key aims for public transport integration so that these can be taken forward into an implementation strategy jointly with transport operators, local authorities and Regional Transport Partnerships.

A.94 As part of the Concessionary Travel Scheme, Smartcard-enabled ticket machines are being fitted to all buses across Scotland. These machines are all capable of issuing and accepting both lightweight and long-lasting Smartcard tickets — and present exciting new opportunities to utilise Smartcards for ticketing products for fare-paying passengers. This infrastructure is intended to be in place on buses across Scotland by the end of 2009.

Indicative Costs

A.95 It is likely that an initial implementation of Smartcard ticketing technologies would cost in the range of £50m - £100m, based on the emerging experience of franchised rail operators who are currently undertaking their own implementations.

Deliverability

A.96 Implementation of the intervention will require the co-operation of all transport operators who participate in the intervention, both from a commercial perspective, and in adjusting their own internal business processes to handle the new system. As the franchising authority for Scotland's rail services, Transport Scotland would be in a position to specify the technology as a franchise output. In the case of unregulated private bus service providers, there will be a need to secure their input and co-operation for participation in the intervention.

³⁵ Integrated Ticketing: A Strategy for Scotland, Transport Scotland, May 2008

11 –TARGETED PROGRAMME OF MEASURES TO IMPROVE LINKS TO THE LOCH RYAN PORT FACILITIES FROM THE TRANS EUROPEAN NETWORK

Intervention description

A.97 This intervention supports the objective to have efficient and effective linkage to the port facilities at Loch Ryan, in particular improving the linkage of the Trans-European Network. This intervention would include measures such as:

- Physical works aimed at providing safer overtaking opportunities such as 2+1 sections, climbing lanes and overtaking lay-bys and improvements to the operation of junctions around Dumfries;
- Improvements to the strategic access around Stranraer (A751); and
- Driver Information System.

A.98 It is envisaged that individual elements would be delivered in a targeted programme to improve journey time reliability for travel to the port facilities at Loch Ryan.

Contribution towards the Scottish Government’s Purpose

A.99 The physical aspects of this intervention would improve journey time reliability, by addressing additional constraints along the route. This would result in efficiency gains for freight traffic travelling to and from the Loch Ryan ports.

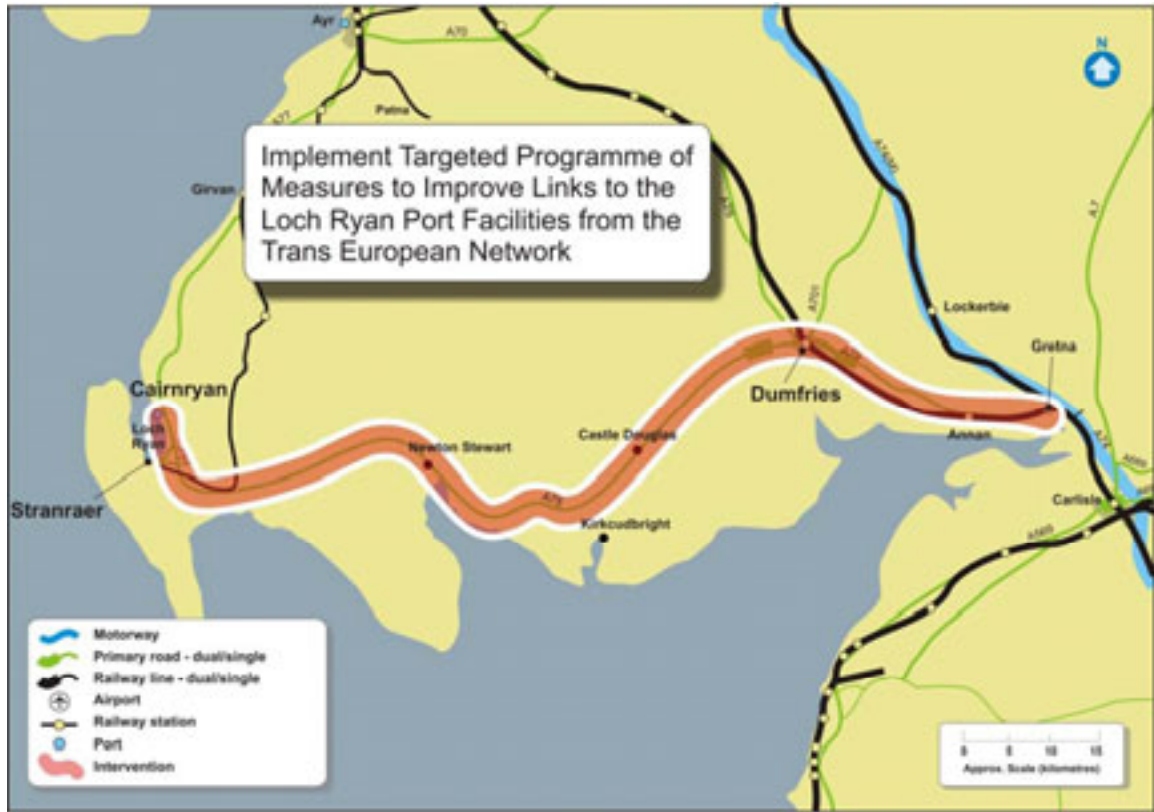
A.100 In addition the physical aspects would be complemented by the introduction of Intelligent Transport Systems (ITS) on the A75, to provide driver information; which would provide a significant contribution towards the objective of efficient and effective links to the ports.

A.101 The programme of works would also contribute towards the need to maintaining and safely operate the network. Reductions in accident numbers would be expected at the improved locations, with up to 50 per cent reduction in certain sections. Severity rates are likely to be reduced by new 2+1 and re-aligned sections.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.102 This intervention includes a range of safety-related and asset management interventions, as addressed in the Strategic Road Safety Plan and the Road Asset Management Plan.



Current Status of Project

A.103 Transport Scotland has invested in widening the A75 at a number of sections along the length of the trunk road to provide safe overtaking opportunities. This intervention provides further enhancements to the A75 and ensures the continuation of localised improvements to this carriageway to improve safety along the route.

Indicative Costs

A.104 The total estimated cost of this route improvement is in the range £10-£50 million.

Deliverability

A.105 These minor interventions can be developed and implemented within the short-medium term as required. Due to the rural nature of much of the corridor, design work would have to take account of the local terrain in order to minimise disruption to the port facilities which provide important tourist and freight links between Northern Ireland and Scotland.

12 – ENHANCING RAIL SYSTEM CAPACITY THROUGH TARGETED IMPROVEMENTS

Intervention description

A.106 This intervention is over and above the day-to-day maintenance of the rail network which is the responsibility of Network Rail and set out in Intervention 2.

A.107 There are parts of the railway network that are operating close to or at capacity during peak periods, with limited or no opportunity for additional services to be operated. Much of the existing signalling infrastructure is becoming less fit-for-purpose. This intervention would cover operational and relatively small scale infrastructure measures such as:

- Replacement of Radio Electronic Token Block signalling in the Highland region;
- Provision of additional signal blocks in heavily used parts of the network;
- Replacement of two-aspect signals with three or four aspect signals in heavily used parts of the network;
- Replacement of single lead junctions with double lead junctions as appropriate to improve efficiency; and
- Replacement of low speed junctions and crossovers as appropriate to improve efficiency.

A.108 This intervention provides upgrades for rail signalling, as well as track and junction layouts to reduce headways and allow more trains to use the network.

Contribution towards the Scottish Government's Purpose

A.109 This intervention would have the effect of improving operational performance and would also lead to reduced journey times where train times are currently constrained by limited capacity and a mix of train speeds. These benefits by themselves would encourage some modal shift from car to rail, hence reducing traffic emissions. In many areas of Scotland, additional rail services could contribute towards objectives where localised rail constraints have been identified. This intervention would provide a strategy to systematically address these constraints.

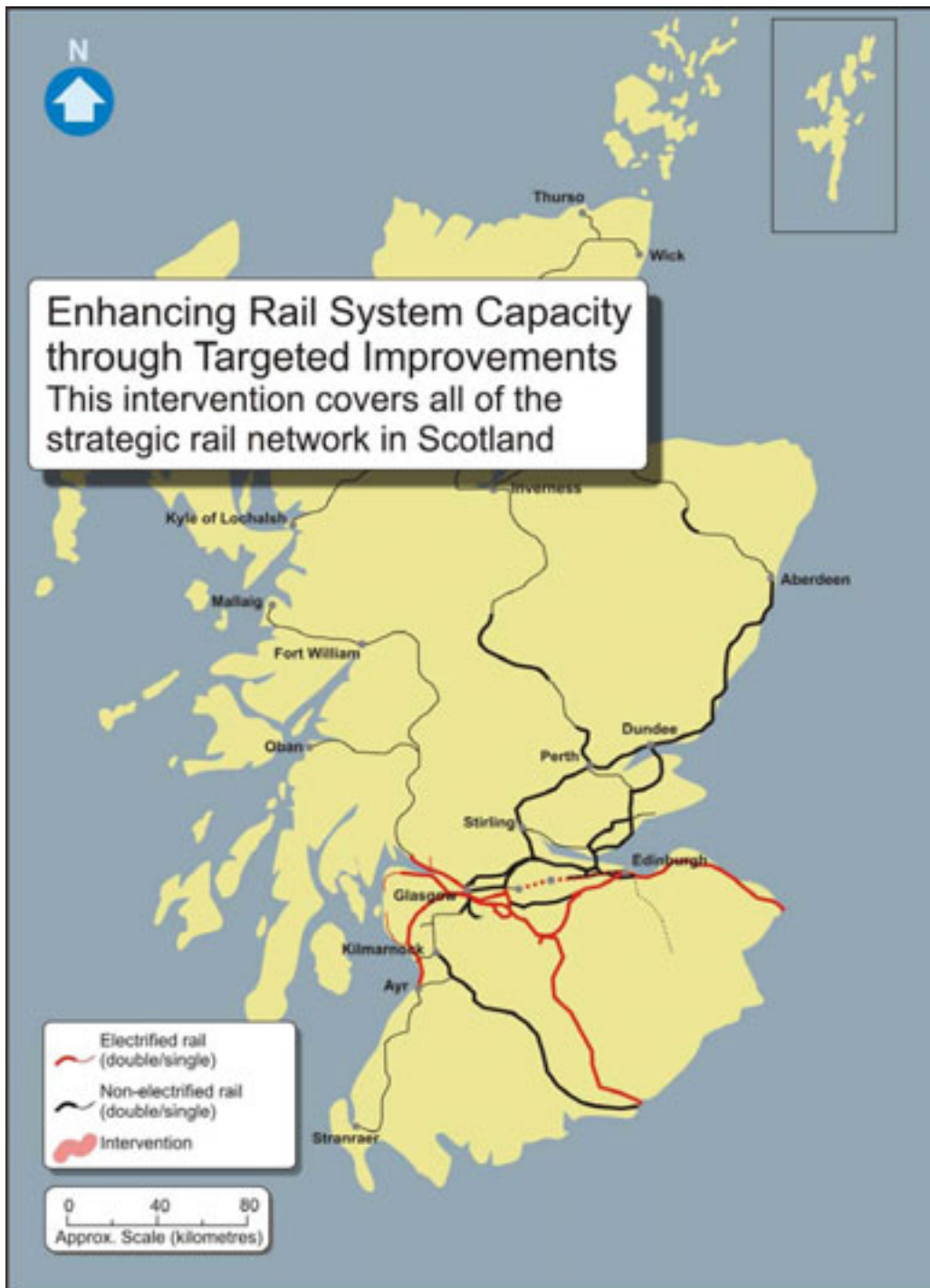
A.110 The main benefits of this intervention include:

- Reducing conflict between services;
- Improving efficiency;
- Reducing journey time variability;
- Improving reliability and resilience; and
- Providing room for growth.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to Other Strategies

A.111 The requirement for strategic rail infrastructure capacity enhancements is highlighted in the National Transport Strategy (Scotland's Railways and Freight Action Plan) as well as the Scottish Planning Assessment and Route Utilisation Strategy. The significance of providing for rail freight access to ports is highlighted in the second National Planning Framework (NPF2).



Current Status of Project

A.112 Some parts of this intervention have been developed as part of proposals in Network Rail's Scottish Route Utilisation Strategy³⁴, and national schemes to replace life-expired signalling and trackside equipment. It is expected that improvement schemes as part of this intervention will be developed to deliver the required route capacity improvements.

Indicative Costs

A.113 This intervention is estimated to cost in the region of £100m - £250m.

Deliverability

A.114 This intervention will be deliverable by Transport Scotland in partnership with Network Rail in their role as owner and operator of the rail infrastructure. Implementing this intervention would require work to take place on the existing rail network. This work would have to be carried out during possessions, where parts of the railway network would be closed, impacting on passenger journeys. However, much of this would could coincide with general maintenance of the network and take place during periods of low demand.

13 – RAIL ENHANCEMENTS IN THE EAST OF SCOTLAND

Intervention description

A.115 This intervention includes an increase in service frequency on rail services across the east of Scotland.

A.116 This intervention would include services such as:

- West Calder to Haymarket (in addition to the committed service improvements as part of Intervention 15, Edinburgh to Glasgow Rail Improvements Programme)
- Edinburgh to Newcraighall (two trains per hour as an extension to existing Dunblane services and two trains per hour to Glasgow and the west of Scotland via the committed Airdrie to Bathgate line. This would replace the existing two trains per hour from Newcraighall to Dunblane and from Bathgate to Newcraighall)
- Edinburgh to Dunbar (as an extension of services from Glasgow and the west of Scotland via the committed Airdrie to Bathgate line)
- Edinburgh to Cowdenbeath semi-fast (as an extension of services from Tweedbank via the committed Borders Rail Link)
- Haymarket to Kirkcaldy semi-fast (additional service on top of existing services)

A.117 This intervention would include additional rolling stock and facilities to support and maintain these services.

A.118 There is limited capacity available at Waverley Station and therefore capacity improvements would be required or alternatively, more efficient use of Waverley would have to be developed (which may include terminating some trains at Haymarket north platform or an equivalent on the south side provided as part of the committed Edinburgh to Glasgow improvements).

A.119 This intervention would include remodelling of various parts of the network to enhance capacity for these services, such as Portobello Junction to Newcraighall and Dunbar station. Additional capacity enhancements such as resignalling and loops would also be included where necessary.

Contribution towards the Scottish Government's Purpose

A.120 This intervention would contribute towards the objectives for Edinburgh and the corridors serving the city, particularly in providing access to areas of economic activity. The increased provision would increase the labour market catchment that can commute into Edinburgh within 60-minutes by 5-10 per cent.

A.121 This intervention would provide additional rail capacity on some of the busiest rail lines in Scotland, resulting in a transfer of up to 5 per cent modal shift from car to rail. The reduction in car journeys could positively contribute towards improved air quality within air quality management areas.

A.122 This intervention is forecast to capture trips from car travel, with an increase of over 1100 new rail passengers during the peak hour approximately half of whom transfer from car.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.123 Improvements to rail services and station facilities on these routes have been raised in the SEStran Regional Transport Strategy, the Scottish Strategic Rail Study³⁶ and the Tay Estuary Rail Study³⁷.



Current status of project

A.124 A Ministerial Statement made on 27th Sept 2007 proposed improvements on the route between Edinburgh and Fife in order to provide improved rail connections to Edinburgh Airport. This intervention is expected to be supported with no significant objections raised.

Possible costs

A.125 The total anticipated cost of this intervention is estimated to be in the range of £250m - £500m.

Deliverability

A.126 The proposed frequency enhancements will require careful timetabling in order to fit as many trains as possible through Waverley station, making full use of the capacity available. This intervention would require significant engineering works on various parts of the rail network. However, increased service frequencies across the east of Scotland would bring capacity enhancement and additional seating.

³⁶ Scottish Strategic Rail Study, Scottish Executive, March 2003

³⁷ Tay Estuary Rail Study, Steer Davies Gleave, May 2003

14 – FORTH REPLACEMENT CROSSING

Intervention description

- A.127 The Forth Replacement Crossing will comprise a cable stayed bridge across the River Forth west of the existing Forth Road Bridge with associated connecting roads and future proofed multi-modal capability.

Contribution towards the Scottish Government's Purpose

- A.128 The Forth Replacement Crossing and its networks will ensure that a key river crossing is maintained. In doing so it will protect the economy of Fife, Edinburgh and beyond from disruption stemming from the uncertainty of the long term viability and operation of the Forth Road Bridge and concerns over the current operational characteristics of the surrounding road network.
- A.129 The bridge and its connections will also offer the opportunity to develop bus, tram or light rail systems connecting Fife, Edinburgh and West Lothian, so encouraging the use of more sustainable modes of transport. They will also support the reduction in travel times and improve journey time reliability for cross Forth trips and improve connections to areas of economic activity including West Edinburgh, Grangemouth, south Fife and Dundee.

Links to Other Strategies

- A.130 The Forth Replacement Crossing is identified as a key national development in the second National Planning Framework (NPF2) and is supported by the SEStran Regional Transport Strategy.
- A.131 The Forth Replacement Crossing recognises its links to development plans for West Edinburgh and Edinburgh Airport, all of which are highlighted in NPF2 and more widely to the plans of SEStran, the City of Edinburgh Council, West Lothian Council and Fife Council. Meetings have taken place with each of these organisations.



Current Status of Project

- A.132 The Forth Replacement Crossing was a fast tracked component of the Strategic Transport Projects Review (STPR).
- A.133 The Forth Replacement Crossing Study (FRCS) identified the main issues surrounding cross Forth Trips, and considered 65 options for meeting objectives identified to address these issues. The FRCS reported to Minister's in December 2007, at which point a decision was made in principal to provide a multi-modal cable stayed bridge and connections to replace the existing Forth Road Bridge.
- A.134 Work on the design development of the Project has been taken forward over the last year recognising the improving prognosis for the Forth Road Bridge. Whilst that structure will not be able to maintain the quality of secure connection required to reliably support the East of Scotland Economy, a clear future role as a public transport corridor has been identified. This has allowed changes to the requirements for the Forth Replacement Crossing and a Managed Crossing Strategy effectively utilising existing infrastructure has been developed. This will be taken forward for authorisation during 2009.

Indicative Costs

- A.135 The Forth Replacement Crossing originally estimated to cost between £3.2 and £4.2 billion at 2016 outturn prices has now been redesigned and is expected to cost between £1.72 and £2.34 billion. This includes VAT, optimism bias and inflation from a 2006 base cost.

Deliverability

- A.136 Design development of the Forth Replacement Crossing is ongoing. The primary factors affecting how soon the project can be delivered will be the resolution of statutory processes and the availability of funding to carry the intervention forward to completion.

15 – EDINBURGH - GLASGOW (RAIL) IMPROVEMENTS PROGRAMME

Intervention description

- A.137 This intervention was identified early in the STPR and, as with the Forth Replacement Crossing, has been brought forward in a study which considered improvements to the capacity, frequency and journey time of rail services between Edinburgh and Glasgow.
- A.138 This intervention supports a number of objectives relating to access to jobs from the perspective of both employers and employees, emissions and public transport capacity on the corridor between Edinburgh and Glasgow.
- A.139 A number of potential packages of infrastructure and service enhancements were examined. The Minister announced to Parliament in Autumn 2007 that the preferred strategy would be to provide:
- An electrified railway between Edinburgh and Glasgow Queen Street (including diversion routes), the line via Cumbernauld and lines to Dunblane and Alloa;
 - A new station at Gogar to serve Edinburgh Airport (via tram) and a new curve at Dalmeny to allow Edinburgh to Glasgow services to access the new station;
 - Six trains per hour between Edinburgh and Queen Street with the fastest journey time of around 35 minutes and a mixture of stopping patterns to serve intermediate stations;
 - Access to Edinburgh Park station for Edinburgh to Glasgow services; and
 - Three trains per hour between Edinburgh and Glasgow Central (one stopping service and two semi-fast services) serving both the Shotts and Carstairs routes.

Contribution towards the Scottish Government's Purpose

- A.140 This intervention would provide an increase in capacity between Edinburgh and Glasgow as well as reducing the journey time between the two cities. These combined would help maintain, and in some cases enhance, the labour market catchment area that can commute into the two cities within 60-minutes, counteracting the forecast decrease in labour market catchment caused by forecast increases in congestion and journey times on the road network. The improvements would encourage travellers to choose to travel by rail instead of private car. Electrification of the lines would also further help to reduce emissions within the corridor between Edinburgh and Glasgow. The intervention also provides a key linkage from the rail network to Edinburgh Airport, through the provision of a new station at Gogar and interchange with the tram.
- A.141 The enhancement to services between Edinburgh and Glasgow via Shotts or Carstairs would improve public transport capacity between Edinburgh and Livingston / Glasgow. It would also improve connectivity and interchange opportunities (via Glasgow Central) between Edinburgh and Inverclyde / Ayrshire, further helping to maintain the labour market catchment area for the two cities, and encouraging rail use in place of private car.
- A.142 The strategic business case for this proposal has been completed and shows it offers value for money.

Links to other strategies

A.143 The requirement for improved rail services between Edinburgh and Glasgow has been highlighted in the National Transport Strategy (Scotland's Railways and Freight Action Plan) and in the Scottish Ministers High Level Output Specification. The intervention is also included in the Scottish Rail Planning Assessment and the Route Utilisation Strategy, as well as the SEStran Regional Transport Strategy 2008-2023.



Current status of project

A.144 The preferred strategy was announced in a Ministerial Statement made on 27 September 2007.

Possible costs

A.145 The cost for this intervention has already been committed, but is estimated to be in the range £500m - £1bn.

Deliverability

A.146 It appears feasible to provide the necessary infrastructure although the need for land purchase will extend the delivery period and electrification will need detailed investigation as well as the impact of signalling changes. A number of component parts of this intervention are deliverable within the short to medium term horizon and the full intervention could potentially be delivered by 2016.

16 – A9 UPGRADING FROM DUNBLANE TO INVERNESS

Intervention description

A.147 The Scottish Government is committed to the dualling of the A9 between Dunblane and Inverness. This intervention considers the full dualling and wider improvement of the A9 between Dunblane and Inverness.

A.148 This intervention supports the objectives to promote journey time reductions between Inverness and the Central Belt, improve the operational effectiveness of the A9, reduce the severity of accidents and address driver frustration.

A.149 The first phase of this intervention would consist of :

- Grade separation of all junctions on the A9 from (and including) Keir Roundabout to south of Broxden Roundabout;
- A9 Dual Carriageway from Perth to Blair Atholl;
- Grade separation of Broxden Roundabout and Inveralmond Roundabout at Perth; and
- Implementation of climbing lanes, 2+1 sections and junction improvements between Blair Atholl and Inverness.

A.150 The subsequent phases of this intervention would consist of:

- Dualling the A9 between Aviemore and Inverness; and
- Dualling the A9 between Blair Atholl and Aviemore.

Contribution towards the Scottish Government's Purpose

A.151 Many of the accidents on the A9 between Dunblane and Perth have occurred at the at-grade junctions. These accidents are often serious or fatal and removal of these would significantly reduce severity rate on this route.

A.152 The grade separation of Keir, Broxden and Inveralmond Roundabouts would remove the congestion at these locations contributing to reduced journey times, improved journey time reliability and improved road safety.

A.153 The A9 between Perth and Blair Atholl is the most heavily trafficked section of the A9 north of Perth. Dualling this section would have the most significant impact on reducing journey times and improving journey time reliability. This would also contribute to a consistent carriageway standard along this section of the A9.

A.154 The introduction of overtaking lanes is also expected to improve safety since evidence elsewhere suggests that the introduction of overtaking lanes can result in a significant reduction in accidents, of up to 50 per cent, on single carriageway routes.

A.155 Dualling the A9 between Blair Atholl and Inverness would further reduce journey times and improve journey time reliability between Perth and Inverness, as well as provide a consistent carriageway standard along the whole of A9 between Perth and Inverness. This section is less trafficked than the rest of the A9 and is therefore considered in subsequent phases. Aviemore to Inverness is more heavily trafficked than Blair Atholl to Aviemore and would therefore take priority in future phases.

A.156 This intervention is expected to provide a significant contribution to the Scottish Government's Purpose of increasing sustainable economic growth. In addition this will also contribute to the national objectives of promoting journey time reductions between the Central Belt and Inverness and the reduction in accident rates. The intervention also addresses the corridor specific objectives of improving the operational effectiveness of the A9 on approaches to Perth and addressing issues of driver frustration.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.157 This intervention links to the Strategic Road Safety Plan and to the Road Asset Management Plan. In particular, the specific intervention proposed here builds on the A9 Route Action Plan Perth to Inverness³⁸, and on the A9 Route Improvement Strategy Study³⁹.

Current status of project

A.158 The Scottish Government has made a long term commitment to dualling the A9 up to Inverness, although it has been recognised that a phased approach is likely. Planning for dualling the southern section is progressing but has not yet moved into a formal process. This is a high profile intervention, with significant public interest at both local and national levels.

Possible costs

A.159 The first phase of this intervention is expected to have a cost in the range £500m to £1bn (Dunblane to Perth £100m-£250m, Broxden and Inveralmond Junctions £50m-£100m, Partial Dualling and 2+1 sections £500m-£1bn) with the subsequent phase in the range £1.5bn to £3bn.

Deliverability

A.160 The environmental impacts this intervention has on several biodiversity sites and designated landscapes have been identified at the strategic level as part of the Strategic Environmental Assessment (SEA) and Appropriate Assessment.

A.161 Careful mitigation of the environmental impacts of this intervention will be required. The design will need to include measures to ensure construction limits impact on these sites. Significant engineering works would also be required at Keir and Broxden junctions, and at Inveralmond the urban nature of the surroundings could constrain design solutions.

³⁸ Review of Route Action Plans Final Report, Scott Wilson, November 2002

³⁹ A9 Perth to Blair Atholl Route Improvement Strategy Study, Scott Wilson, February 2006

17 – RAIL ENHANCEMENTS ON THE HIGHLAND MAIN LINE BETWEEN PERTH AND INVERNESS

Intervention description

A.162 This intervention supports objectives to reduce journey time and increase travel opportunities between Inverness and Perth, more effectively linking Inverness to the Central Belt.

A.163 Improvements to the Highland Main Line are proposed, providing:

- An increase in service frequency (minimum of hourly between Inverness and Perth with additional peak express services); and
- A reduction in journey times of approximately 35 minutes, resulting in Edinburgh to Inverness journeys of under three hours, with similar reductions for services to Glasgow.

A.164 Journey time reductions to benefit passenger services would be delivered through, timetable developments, minor infrastructure enhancements such as tail light cameras, line speed improvements, additional loops, dynamic loops or lengthening of double track sections, signalling improvements and more powerful traction. It is envisaged that this could be delivered in two phases. Phase 1 will seek to maximise service frequency and journey times on existing infrastructure. Phase 2 would comprise infrastructure enhancements to allow even faster services to operate.

A.165 Additional freight improvements: The passenger enhancements could be optimised to also benefit freight operations. It is envisaged that this would include:

- Provision of bi-directional signalling to reduce the impact of engineering works on the route (permitting the route to remain open for freight throughout the day and week);
- Increased length of freight loops (allowing longer freight trains); and
- Removal of speed limits below 75 mph Permanent Speed Reductions (PSRs) for freight trains.

A.166 Included within this intervention is the capability to operate low floor wagons that are currently becoming available for use on the network. These would allow standard containers to be carried on existing infrastructure with minimal physical works, such as targeted gauge enhancements at appropriate structures.

Contribution towards the Scottish Government's Purpose

A.167 This intervention would provide journey time improvements between Inverness and Perth and onwards to the Central Belt, contributing to objectives relating to these issues. Increasing the frequency of services would provide further benefits through additional opportunities to travel. The reduction in journey time of around 20 per cent is significant and would make the rail service more competitive with the current car journey.

A.168 The freight improvements would make it considerably more attractive for freight hauliers to move containers and other goods by rail, by reducing journey times.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.169 Service improvements on this corridor have been highlighted in the Scottish Ministers' High Level Output Specification and the Highland "Room for Growth" Study⁴⁰, and interface with the Scottish Rail Planning Assessment and the Network Rail Route Utilisation Strategy for Scotland. This intervention would build on Intervention 7 (Reconfiguration of the National Rail Timetable).



⁴⁰ Highland "Room for Growth" Study Final Report, Scott Wilson, March 2006
105

Current status of project

A.170 As a 'Tier 3' intervention in the Scottish Ministers' High Level Output Specification, Network Rail have been asked to produce a credible and affordable delivery plan to progress development of this intervention, for potential implementation during Control Period 4 (2009-2014). There has been no specific detailed consultation on this intervention. However a commitment to Phase 1 was made in a Scottish Government statement on the 5th of August 2008.

Possible costs

A.171 No detailed cost estimates have been made for this proposal, but a suggested range of £200 million to £450 million has been identified.

Deliverability

A.172 The physical improvements required to support this intervention would need to be carefully managed in order to minimise the potential adverse impact on the environment.

A.173 The environmental impacts this intervention has on designated biodiversity and landscape sites have been identified at the strategic level as part of the Strategic Environmental Assessment (SEA) and Appropriate Assessment. Appropriate mitigation and avoidance measures have been identified and will be further refined should this intervention be taken forward.

A.174 This intervention should gain support in terms of the environmental benefits gained through capturing journeys currently made by cars and goods vehicles.

18 – UPGRADE A96 TO DUAL CARRIAGEWAY BETWEEN INVERNESS AND NAIRN

Intervention description

- A.175 This intervention supports the objectives to reduce the accident rate and severity rate on this route and improve connectivity between Inverness and communities to the east. It would include providing a new dual carriageway on the A96 corridor between Inverness and Nairn, giving improved access to Inverness Airport and the future growth areas in the A96 corridor.
- A.176 A new link connecting the A96 and the A9 (south of Inverness) would provide relief for Raigmore Interchange.

Contribution towards the Scottish Government's Purpose

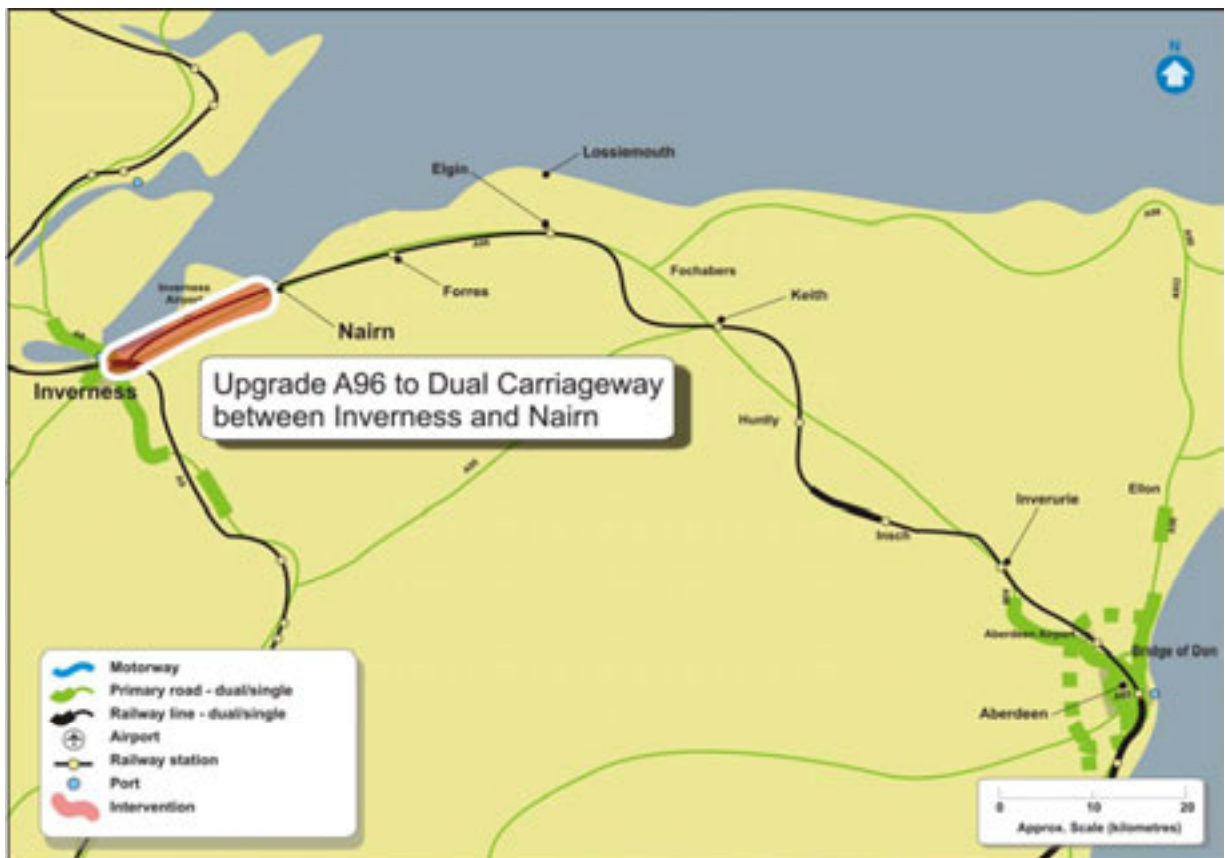
- A.177 Upgrading the A96 to dual carriageway between Inverness and Nairn is expected to reduce accident rates (by around 40 per cent) by providing a higher standard of road. It would also reduce journey times along this section of the corridor, improving connectivity between Inverness and communities to the east (including the planned developments in this corridor at Tornagraim), and helping to increase the labour catchment area for Inverness. Improvements would also be felt on longer distance road journeys between Aberdeen and Inverness.
- A.178 This intervention would have an adverse environmental impact largely due to construction impacts on the surrounding natural and historic features.
- A.179 The link between the A9 and the A96 would further reduce congestion by allowing traffic between the A9 and A96 to avoid local traffic congestion at Raigmore Interchange. These benefits are reflected in the economic analysis, which suggests that the intervention offers value for money.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

- A.180 The intervention would link to various other A96 improvements identified in the Route Action Plan (aimed at reducing accident severity), and builds on the Strategic Road Safety Plan and Road Asset Management Plan. Further enhancements to this route may also be a possibility as part of the targeted road congestion interventions described below.
- A.181 This intervention would also assist in facilitating the growth on the A96 as identified in the A96 Masterplan proposals. Improvements on this corridor were highlighted in the Hitrans Regional Transport Partnership (RTP) and Horizontal themes, the Inverness Airport Surface Access Strategy, and in the Aberdeen to Inverness Transport Corridor Study⁴¹.

⁴¹ Aberdeen to Inverness Transport Corridor Study STPR STAG Pre-Appraisal – Final Report, Scott Wilson, April 2007



Current status of project

- A.182 This is an important intervention to the economy of Inverness and the surrounding area, with significant public interest at both local and regional levels.
- A.183 The dualling of the A96 from Inverness to Nairn is being discussed with Highland Council and other stakeholders as part of the wider consideration of the A96 Masterplan. This consideration also includes the rail proposals set out in STPR intervention 19 and the additional roads proposals set out in STPR intervention 22.

Possible costs

- A.184 The total costs for both phases of this intervention are estimated to be in the range £250m - £500m.

Deliverability

- A.185 It is anticipated that there are unlikely to be any technical issues with constructing this intervention.
- A.186 The environmental impacts this intervention has on the surrounding natural and historical features have been identified at the strategic level as part of the Strategic Environmental Assessment (SEA) and Appropriate Assessment. Appropriate mitigation and avoidance measures have been identified and will be further refined should this intervention be taken forward.

19 – RAIL SERVICE ENHANCEMENTS BETWEEN ABERDEEN AND INVERNESS

Intervention description

A.187 This intervention supports the objectives to reduce journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness. The improvements to the railway between Aberdeen and Inverness would allow:

- An increase in service frequency (minimum of hourly service over the full route);
- A reduction in journey time by about 20 minutes between Aberdeen and Inverness;
- Extra rail services between Nairn and Inverness to provide an overall two trains per hour over this section; and
- A new station at Dalcross with Park-&-Ride facilities and interchange facilities with Inverness Airport.

A.188 Phase 1 would involve the introduction of new loops in the area and line speed improvements. Phase 2 would involve more comprehensive improvements to line speed, journey times and the provision of some dual tracking on approaches to Inverness and Aberdeen. Development of this intervention will also give consideration to the option of a station at Kintore.

Contribution towards the Scottish Government’s Purpose

A.189 This intervention would reduce journey times between Aberdeen and Inverness and improve connectivity between the cities and the intermediate communities. It would also increase opportunities to travel by providing a more frequent service at regular intervals.

A.190 At the Inverness end of the route, the intervention would improve connectivity by public transport between Inverness City Centre and the growth area to the east including Inverness Airport and the A96 corridor.

A.191 Within Aberdeen this intervention would improve access to the Dyce area and, if combined with improvements to the connections between Aberdeen and the Central Belt (STPR Intervention 23), would also provide greater opportunity for cross city travel by rail.

A.192 The journey time savings of approximately 20 minutes are significant and this, coupled with an increased frequency, would make rail travel a genuine alternative to car travel. There will also be benefits from emissions reduction resulting from the ability to capture a higher share of inter-city travel.

A.193 The cost of this intervention is driven by the need to provide double track on the approach to Aberdeen. However, the improvements to journey time of around 20 per cent would be significant both for existing users and for those transferring from car and it is therefore considered to offer value-for-money.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.194 Service improvements on this corridor have been highlighted in the Scottish Ministers High Level Output Specification and in the Aberdeen to Inverness Transport Corridor Study.



Current status of project

A.195 As a 'Tier 3' intervention in the Scottish Ministers' High Level Output Specification, Network Rail have been asked to produce a credible and affordable delivery plan to progress development of this intervention, for potential implementation during Control Period 4 (2009-2014). There has been no specific detailed consultation on this individual intervention. However it is expected that any measure which promotes modal shift to more sustainable transport would achieve public support.

Possible costs

A.196 The costs for this intervention are driven by the need to provide double track on approach to Aberdeen. Total cost is estimated to be in the range £250m - £500m.

Deliverability

A.197 The deliverability of this intervention is considered technically and operationally feasible. The construction of new loops and double track sections may require upgrading of structures and a Transport & Works Act depending on the location of any works and whether they are built within the existing railway alignment. It is likely that this work will require new signalling systems designed to modern standards. These would have to interface with existing systems and there is a risk on the basis of system compatibility. Ground conditions may be a risk depending on the site of the proposed station and where the improvements are made.

A.198 The work required to add new loops and additional tracks would require the closure of the line when connecting them to the existing rail network. This would cause disruption to passengers that use the line, although this work may be done during routine maintenance possessions. There is a risk that running extra services will have an impact on other parts of the network, such as at Inverness and Aberdeen stations.

20 – GRANGEMOUTH ROAD AND RAIL ACCESS UPGRADES

Intervention description

- A.199 This intervention supports the objective to improve access to Grangemouth port and the freight hub, by improving access for both road and rail freight. Improved road access from Grangemouth onto the motorway network would be provided through upgrades to Junctions 5 or 6 on the M9, possibly developing new slip roads, for instance. The A801 would be upgraded between Grangemouth and the M8 (including carriageway improvements and a new viaduct) to serve developing industrial and distribution facilities along the M8 corridor.
- A.200 Improved rail access would be provided through capacity enhancements at and around Grangemouth Junction, to allow more trains to access the freight facilities at Grangemouth. These would build on the committed improvements to the Edinburgh – Glasgow route, and would include electrification between Coatbridge and Grangemouth as well as increased loading gauge to allow larger containers to be carried. In addition, track modifications are proposed to provide improved access from the west and offer the possibility of improved access or services running on east coast routes.

Contribution towards the Scottish Government's Purpose

- A.201 Improving the direct link from Grangemouth to the developing industrial and distribution facilities along the M8 via the upgraded A801 would make it more suitable for the role that it is currently performing and allow for increased economic growth on this corridor.
- A.202 In addition it would offer significant journey time improvements and a reduction in the accident rate of around a third on the A801. Provision of this high quality route would also offer the opportunity for existing Heavy Goods Vehicles which use the M8 and M9 to reduce their current journey times by a minimum of 20 minutes. This could bring some benefits for the strategic road network in the West Edinburgh area.
- A.203 This intervention would deliver a small positive impact on the environment as a result of the removal of some Heavy Goods Vehicles from parts of Grangemouth and rail improvements that include electrification, both of which are envisaged to contribute to reduced emissions. This intervention would however impact on the designated environmental sites along the route and this would need to be considered further in the development of a proposed alignment of a new road crossing of the Avon Gorge.
- A.204 The rail element would allow more freight trains to run into Grangemouth freight terminal without conflicting with passenger services, which in turn would improve journey time reliability. Electrification would allow freight trains to be operated from the West Coast Main Line by faster electric locomotives. Increasing the loading gauge would allow larger containers to be carried to and from Grangemouth. All of these improvements would also help make rail freight more attractive for hauliers.
- A.205 The economic analysis of this intervention suggests that overall the intervention offers value for money.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.206 Rail enhancements would be associated with the proposed enhancements to Intervention 15 (Edinburgh to Glasgow Rail Improvements Programme). Requirements for improved access to Grangemouth have been highlighted in the SEStran Regional Transport Strategy (RTS), Falkirk Council development plans and the Network Rail RUS for Scotland.

Current status of project

A.207 Grangemouth Freight hub is designated as a National Development in the National Planning Framework (NPF2). The upgrades to Junctions 5 or 6 of the M9 and the rail improvements to Grangemouth would reduce flows, especially Heavy Goods Vehicles, through urban areas, however the construction and subsequent operation of the junctions may impact on surrounding residential properties. The A801 upgrade would generally be welcomed and has been promoted by Falkirk and West Lothian Councils.

Possible costs

A.208 The total cost of this package is estimated to be in the range of £100m-£250m.

Deliverability

A.209 This intervention is considered to be technically and operationally feasible. It could however impact on the designated environmental sites along the route and this would need to be considered further. The intervention may require modification of Junction 6 with the construction of slip roads from the motorway on three approaches. This may be difficult to construct due to the proximity of properties and local roads.

A.210 It is likely that current road users on the M9, the A801 and other adjacent roads such as the A706 and the A905 would be affected during construction. However following construction, it is unlikely that any factors would negatively affect the operation of the intervention during its projected life. The A801 is currently a non-trunk road and comes under the responsibility of the relevant local authorities. It is not clear if this would remain the case after any upgrade. Upgrades on the rail network may affect existing services during engineering possessions.

21 – UPGRADE EDINBURGH HAYMARKET PUBLIC TRANSPORT INTERCHANGE

Intervention description

A.211 This intervention would contribute significantly to a number of objectives for Edinburgh relating to improvements in public transport interchange, connections to the airport and enhanced rail capacity.

A.212 This intervention would consist of:

- Improvements to platform level access; and
- New at-grade concourse.

A.213 Further details of this intervention can be found in the Haymarket Interchange Feasibility Study – Final Report⁴², with reference to Phase 1 intervention.

Contribution towards the Scottish Government's Purpose

A.214 This intervention would provide a significant contribution towards two of the objectives for Edinburgh, 'to maintain the 60-minute commutable labour market area at the current level, with a particular focus on linking areas of economic activity' and 'to enhance public transport interchange opportunities, where feasible to do so', by providing a 'step-change' in interchange facilities in Edinburgh. There is a forecast 50 per cent increase in rail demand between 2005 and 2022, as well as the growth in bus and tram passengers. By providing the opportunity for transfer between heavy rail, light rail and bus, opportunities for travel to areas in west Edinburgh, including the airport, would be greatly enhanced.

A.215 This intervention would complement measures to maximise the use of the station and reduce pressure on Waverley Station and the link between the two, such as the additional bay platform.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.216 Creation of an enhanced interchange at Haymarket would complement the land use changes in west Edinburgh and would also facilitate additional commercial development in the surrounding area. It would also build on the proposed Haymarket Station Capacity Project which involves initial capacity improvement works and the improved interchange with the tram and bus networks.

⁴² City of Edinburgh Council, April 2008



Current status of project

A.217 The deliverability of this intervention is considered technically and operationally feasible. The intervention is at an early stage of development. Consultations have been undertaken with key stakeholders, local residents and businesses. The results were incorporated into the preferred option for the existing intervention⁴³. Any further developments for this intervention, which promotes modal shift, could be viewed favourably.

Possible costs

A.218 Costs for this scheme are estimated to be in the range £50m - £100m.

Deliverability

A.219 It is unlikely that any untried techniques would be required during implementation of this intervention, however during the design stage localised issues could arise which require increased technical capabilities to be addressed.

A.220 Given the proximity of the site to a busy rail line with continued operations being essential, and the relationship to the newly constructed tram route, issues related to constructability and phasing would be critical considerations to successful project delivery.

⁴³ <http://www.haymarketinterchange.com/index.php>

22 – TARGETED ROAD CONGESTION / ENVIRONMENTAL RELIEF SCHEMES

Intervention description

A.221 On a number of corridors throughout Scotland, objectives have been identified to reduce conflicts between strategic and local traffic. Reducing these conflicts can significantly contribute to road safety, journey time reliability, reducing emissions and reducing severance.

A.222 This intervention targets specific locations on the road network where improvements would address these issues and includes measures such as:

- Upgrade of the A77 from single to dual carriageway around Ayr, grade separation of key junctions and enhancements south of Ayr, such as a bypass of Maybole (part 1);
- Enhancements on the A737 such as a bypass around Dalry (part 2);
- Junction improvements for the A720 Edinburgh City Bypass – such as at Sheriffhall Roundabout (part 3); and
- Enhancements to the A96 such as a bypass at Nairn and a new Inveramsay Bridge (part 4).

Contribution towards the Scottish Government’s Purpose

A.223 The grade separations on the A77 between Whitletts Roundabout and Bankfield Roundabout, would remove the conflict of local and strategic traffic, as well as reducing journey times by approximately 10 minutes. Upgrading the A77 to the east of Ayr would also provide additional capacity for traffic that is likely to be generated as Ayr expands to the south east. These interventions would also improve access to the ports at Loch Ryan with consequential benefits for freight and passenger traffic.

A.224 Providing improvements on the A737 such as a bypass of Dalry would help to reduce the conflict between local and strategic traffic that occurs along this route, thus improving road safety and journey time reliability on the A737.

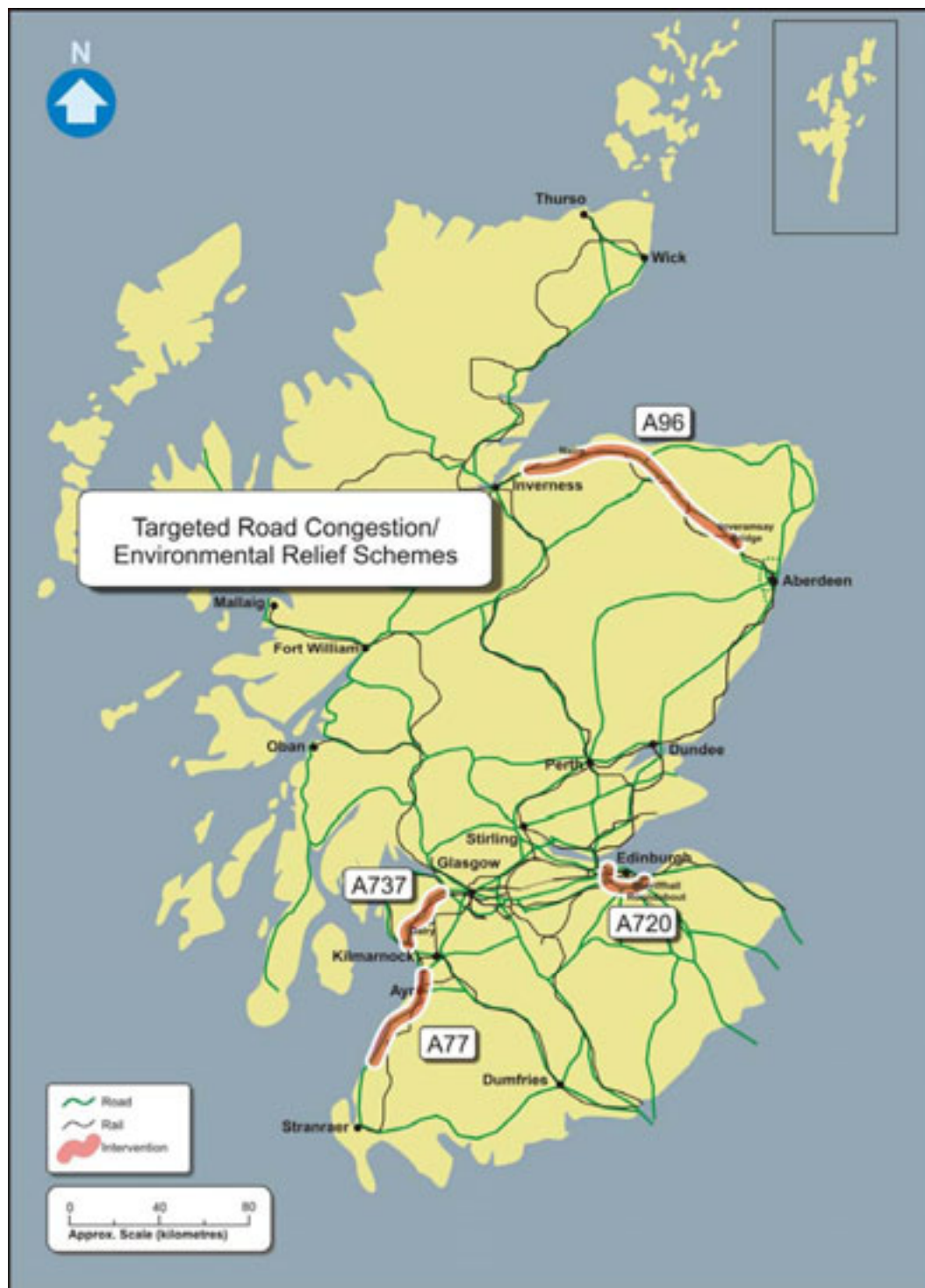
A.225 The A720 improvements would help to maintain the 60-minute commutable labour market area around Edinburgh, and would provide benefits for journeys to or between two of Edinburgh’s areas of economic activity, West Edinburgh and the Shawfair development. Journey time reductions of approximately 5 minutes are forecast with this improvement for all elements.

A.226 Enhancements to the A96 such as a bypass around Nairn would reduce the conflict between local and strategic traffic and improve journey times and journey time reliability along the route.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.227 These interventions have been highlighted in the relevant Regional Transport Strategies. The A96 bypass interventions would build on Intervention 4 (Targeted Programme of Measures to Reduce Accident Severity in North and West Scotland) and add to the A96 enhancements proposed at the western end in Intervention 18 (Upgrade A96 to Dual Carriageway between Inverness and Nairn).



Current status of project

A.228 Many of the improvements have been known to the public for a number of years and there would appear to be wider support for them, however the environmental impacts and detailed design of proposals could prompt negative public opinion.

Possible costs

A.229 The total cost of this intervention is estimated to be in the range £100m - £250m.

Deliverability

A.230 The deliverability of this intervention is considered technically and operationally feasible. This intervention would use no new untried techniques although there would be some major infrastructure works needed in order to cross major roads and railway lines as well as rivers and burns, which all of the proposed bypasses would need to do. There are also a number of SSSIs, ancient woodlands and ancient monuments which have to be taken into account when designing and constructing the bypasses.

A.231 The environmental impacts this intervention has on cultural heritage and landscape have been identified at the strategic level as part of the Strategic Environmental Assessment (SEA) and Appropriate Assessment, however reductions in congestion are expected to contribute towards a decrease in emissions. Appropriate mitigation and avoidance measures have been identified and will be further refined should this intervention be taken forward.

A.232 Construction work may affect the environment of surrounding areas and may cause delays to traffic, however there would be no issues following the completion of the works. The responsibility for operational issues on the proposed measures in this intervention would remain with Transport Scotland and its maintenance contractors. Responsibility for the existing routes through the towns could pass to the local authority.

23 – RAIL SERVICE ENHANCEMENTS BETWEEN ABERDEEN AND THE CENTRAL BELT

Intervention description

A.233 This intervention supports the objectives to improve public transport competitiveness between Aberdeen and the Central Belt and provide enhanced opportunities to move freight by rail. It would involve:

- Recasting of the passenger timetable on the Aberdeen – Dundee – Edinburgh / Glasgow corridors to provide express and stopping services;
- Providing one express train per hour to Glasgow (two hour fifteen minute journey time);
- Providing one express train per hour to Edinburgh (two hour journey time); and
- No stops at intermediate settlements for express services (except Dundee).

A.234 Phase 1 would include line speed improvements, additional loops to allow passing of freight trains, and upgraded signalling along the entire length of the line to reduce headway times. The intervention would also require more powerful rolling stock. Phase 2 would involve the removal of the single track at Usan, including a new bridge over Montrose Basin.

A.235 The passenger enhancements could be optimised to also benefit freight operations. It is envisaged that this would include:

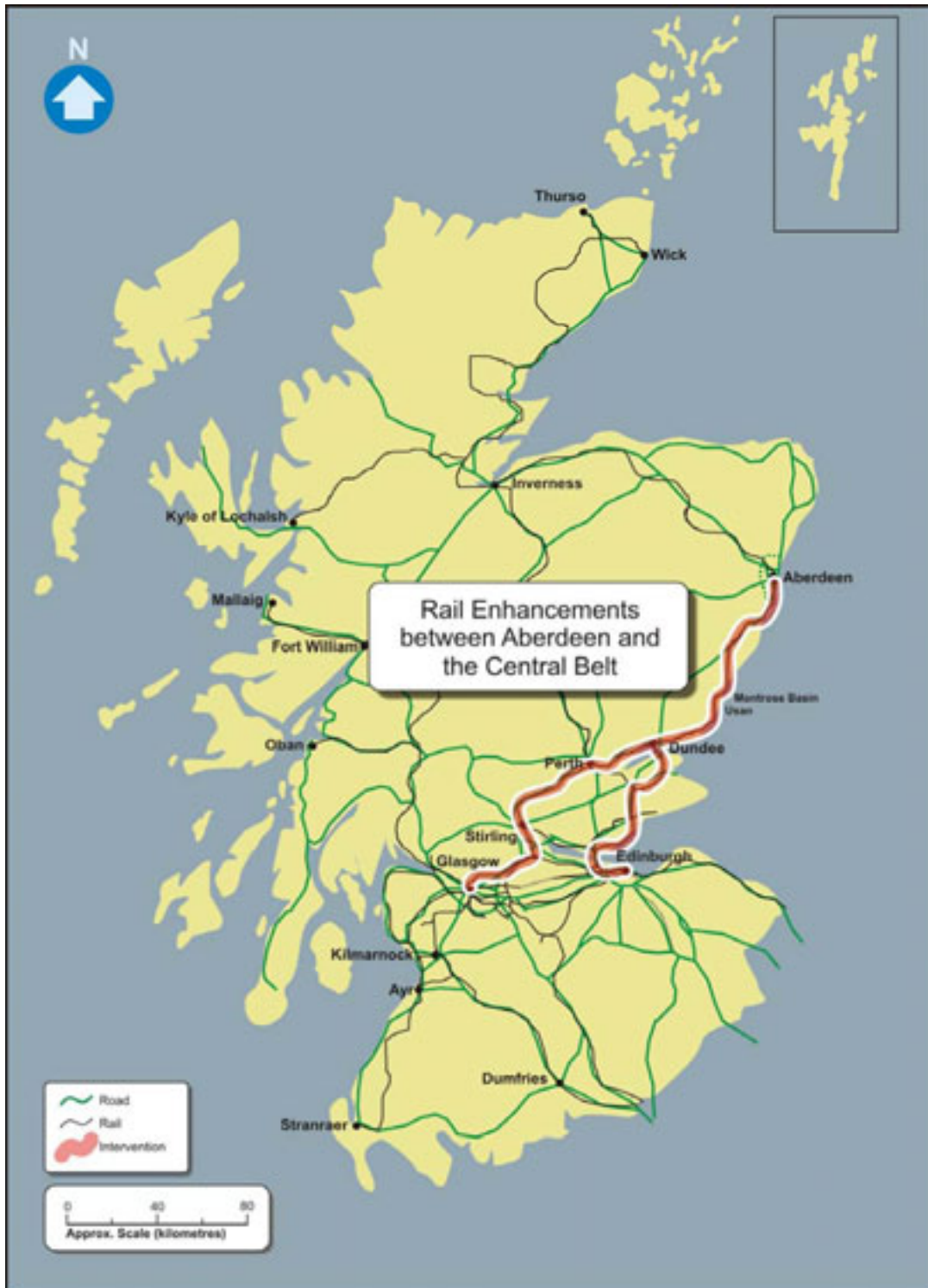
- Provision of bi-directional signalling along the route to reduce the impact of engineering works on the route (permitting the route to remain open for freight throughout the day and week);
- Increased length of freight loops (allowing longer freight trains); and
- Removal of speed limits that are below 75 mph for freight trains.

A.236 Included within this intervention is the capability to operate low floor wagons that are currently becoming available for use on the network. These would allow standard containers to be carried on existing infrastructure with minimal physical works, such as targeted gauge enhancements at appropriate structures.

Contribution towards the Scottish Government's Purpose

A.237 This intervention would help to reduce journey times between Aberdeen and the Central Belt by around 20 minutes, the majority of which would be delivered under Phase 1. This intervention would assist in allowing travellers to achieve an effective working day when travelling between Scotland's four largest cities. These improvements would lead to an increase in demand for rail travel, and a modal shift from private car use. The freight improvements would make it considerably more attractive for freight hauliers to move containers and other goods by rail, by reducing journey times.

A.238 The improvements required to facilitate the improved passenger services are relatively modest compared with the works required for freight. This gives the passenger service improvements a good performance in terms of value for money, with the freight improvements being more marginal. However, the potential benefit from this in terms of reduced emissions control would make the overall improvement worthwhile.



	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.239 Infrastructure links to improve journey times between the Central Belt and Aberdeen have been identified as one of the outputs in the Scottish Ministers' High Level Output Specification.

Current status of project

A.240 As a 'Tier 3' intervention in the Scottish Ministers' High Level Output Specification, Network Rail have been asked to produce a credible and affordable delivery plan to progress development of this intervention, for potential implementation during Control Period 4 (2009-2014). In general terms, the intervention would improve service provision and modal shift and would therefore be met with public approval. The movement of freight from road to rail would be generally welcomed.

Possible costs

A.241 Costs for the passenger service enhancement are estimated to be in the range £100m - £250m for the Phase 1 passenger improvements, and a further cost of £100m - £250m for Phase 2. The additional freight improvements are estimated to cost £50m - £100m.

Deliverability

A.242 The deliverability of the intervention is considered technically and operationally feasible. The crossing over the Montrose Basin at Usan would potentially impact negatively on the local environment, and will need to be planned with care. However, this component if constructed would provide operational efficiencies and remove the only single track section of the East Coast Main Line. The physical works do not use any untried construction, although localised issues requiring increased technical capabilities to overcome might arise as the design process progresses. There are a large number of structures along the route for improvement, including under and over-bridges, viaducts and tunnels. All will need to be checked to determine the need for suitable upgrade to allow envisaged line speed and freight gauge enhancements. Additional loops will also be needed to allow freight trains to be passed.

A.243 During implementation of the proposed improvements the line might be closed for a period of time which would affect current users. Enhanced service frequencies would require additional rolling stock, train crew and timetable amendments. The sourcing of more powerful rolling stock would further enhance the benefits of this intervention.

A.244 The environmental impacts this intervention has on biodiversity and water quality have been identified at the strategic level as part of the Strategic Environmental Assessment (SEA) and Appropriate Assessment. Appropriate mitigation and avoidance measures have been identified and will be further refined should this intervention be taken forward.

24 - WEST OF SCOTLAND STRATEGIC RAIL ENHANCEMENTS

Intervention description

A.245 This intervention supports the terminal capacity issues in Glasgow, which significantly constrain the future ability of the rail network in the West of Scotland to respond to challenges and facilitate change. This intervention supports the objectives to address rail capacity issues in central Glasgow and increase public transport access to areas of economic activity. It also assists in contributing to objectives within corridors that serve Glasgow. The detail of the strategy builds on improvements to be delivered through the Edinburgh to Glasgow Improvements Programme, and could include:

- The development of a Metro/Light Rapid Transit network across Glasgow comprising a mixture of conversion of heavy rail (e.g. part or all of the Cathcart Circle), lines on existing redundant infrastructure (e.g. Great Western Road / Botanic Gardens), new lines (e.g. Clyde Waterfront) and some on-road or next-to-road sections; and/or
- The provision of a new city centre station linking the rail network to the south and east of the city; and/or
- The provision of a new city centre station linking the north and south rail networks.

A.246 Both of the new city centre station options would provide additional platform capacity in the city centre and permit cross-city services to be provided.

A.247 A Metro/Light Rapid Transit system could include new stations, improved service frequencies and improved access to and across central Glasgow. The system would be rolled out on a phased basis. The operational concept for the system using proven technology could be expanded to include a new crossing of the Clyde to around the Southern General Hospital and other lines to link areas not currently served by the heavy rail network.

Contribution towards the Scottish Government's Purpose

A.248 Existing Glasgow rail terminal capacity will be at capacity within the timeframe of the STPR. The lack of future rail terminal capacity places a significant constraint on the provision of additional rail services to meet future growth.

A.249 The analysis has identified that previous development of the rail network in the West of Scotland has been successful in making best use of the network by implementing small scale interventions and targeting individual constraints. The issue of terminal capacity cannot be addressed in this way, meaning that a 'step-change' is required in order to meet predicted future demand. This 'step-change' will be supported by some smaller scale interventions and enabling works. Some of these may be deliverable earlier than the major component(s) and allow some interim relief to be gained.

A.250 Detailed analysis of the problems has been undertaken to understand the nature of the terminal capacity issues within the wider West of Scotland context. This analysis, in conjunction with the objectives, has allowed the identification of broad core elements, each of which could form the basis of the strategy to address the objectives:

- Development of a Metro/Light Rapid Transit network; and/or

- New city centre station to improve capacity and cross city links.

A.251 Development of these core elements has been undertaken to a level to confirm that each could provide a workable solution. This has included consideration of phasing and interaction both within and beyond the STPR period to deliver a meaningful solution. The elements identified vary in terms of cost, risk, phasing, potential benefits, delivery timescale and in the way that they address the objectives. The elements are also not exclusive, so the strategy could for example include a new city centre station and the development of certain Metro/light Rapid Transit lines.

A.252 The strategy will provide a level of 'step-change' that permits a fundamental restructuring and realignment of services across the West of Scotland and potentially beyond. The details of this are undefined, meaning that the potential benefits that could be gained are not yet fully understood. Similarly, the extent to which the Metro/Light Rapid Transit network would be developed is not a fixed proposal, but a number of phases have been identified and considered. It is however understood that the additional capacity provided by the overall strategy would be such that it would provide for a variety of potential service enhancements, including other interventions identified within STPR.

A.253 This intervention would complement the development of intercity rail operations, giving an expanded public transport hierarchy. Metro/Light Rapid Transit could provide for inner suburban movements, leaving heavy rail to cater principally for outer suburban and links to surrounding towns. By providing cross-city routes, the Metro/Light Rapid Transit network could connect across Glasgow and also take pressure off the existing interchange facilities focused in the city centre.

Links to other strategies

A.254 The need to target capacity issues in the Glasgow suburban network and central Glasgow has been highlighted by Scotland's Railways and Network Rail's Scotland Route Utilisation Strategy. The conversion of parts of the Glasgow suburban rail network to light rail operations has been identified in Scotland's Railways and the Scottish Planning Assessment.

Current status of project

A.255 There is currently no formal commitment to this intervention.

Possible costs

A.256 The scale of investment required to deliver one, or a combination, of the elements has been considered in the context of providing a package that effectively addresses the objectives. On this basis, the estimated cost is in the range of £1.5bn to £3bn, although some of this would extend beyond the STPR delivery period.

Deliverability

A.257 At this stage of intervention development, it is considered that the various options would be technically and operationally feasible to build. There are a number of significant planning and construction risks associated with these options. There are also a number of uncertainties at this stage. A more detailed assessment is required to quantify these risks and reduce the uncertainties.

25 – LIGHT RAPID TRANSIT CONNECTIONS BETWEEN FIFE AND EDINBURGH

Intervention description

A.258 This intervention supports the objectives to increase public transport capacity between Fife and Edinburgh and supports connections to the proposed national developments of the Forth Replacement Crossing and Edinburgh Airport (Strategic Airport Enhancements) identified in the National Planning Framework (NPF2).

A.259 The intervention would consist of a bus based rapid transit service over the Forth providing improved connections across the Forth Estuary. In particular it would connect the communities in Fife with the business and commercial opportunities in Edinburgh and West Lothian.

Contribution towards the Scottish Government's Purpose

A.260 This intervention would ease congestion by offsetting the forecast decrease in capacity for road users and would result in a slight increase in the 60-minute commutable market area for Edinburgh.

A.261 This intervention could provide an efficient means to access West Edinburgh, including Edinburgh Airport from Fife complementing the heavy rail connections via a new interchange at Gogar (as part of Edinburgh to Glasgow Rail Improvements Programme).

A.262 Overall the proposed intervention performs strongly against the stated objectives and could be implemented in conjunction with strategic Park-&-Ride and the provision of priority vehicle lanes.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.263 This intervention is dependent on the Forth Replacement Crossing. Provision for segregated public transport services is being considered in that intervention's development and is highlighted in the SEStran Regional Transport Strategy.



Current status of project

A.264 Options for provision for Light Rapid Transit (LRT) interventions are being considered as part of the planning of the Forth Replacement Crossing. There has been no specific detailed consultation on this individual intervention, however it is expected that any measure which increases public transport capacity and promotes modal shift to more sustainable transport would achieve public support.

Possible costs

A.265 The total cost is estimated to be in the range of £10m to £50m.

Deliverability

A.266 The deliverability of this intervention is considered technically and operationally feasible. The intervention is dependent on the provision of a segregated LRT route across the Forth. There are no significant technical issues or operational issues related to the implementation of this intervention or during its projected life.

26 – RAIL ENHANCEMENTS BETWEEN INVERCLYDE / AYRSHIRE AND GLASGOW

Intervention description

A.267 This intervention would provide four trains-per-hour each in both directions between Glasgow and Ayr, Glasgow and Kilmarnock and Glasgow and Gourock with each route served by two semi-fast services and two stopping services.

A.268 The Paisley Canal line would be reconnected to the Ayrshire line and four trains-per-hour between Glasgow and Johnstone. This would also provide an alternative route for passenger and freight services to and from Ayrshire. The intervention would also provide two trains-per-hour between Glasgow and Wemyss Bay. As well as additional rolling stock, this is likely to require the following infrastructure enhancements:

- Signalling upgrades between Kilwinning and Paisley;
- Reinstatement of the line from Elderslie to Paisley Canal, provision of double track and electrification on the existing Paisley Canal branch and increased track capacity between Paisley and Glasgow;
- Provision of turnback facilities at Johnstone;
- Extension to the Lugton loop and a new loop between Kilmaurs and Stewarton;
- Additional platform capacity at Glasgow Central as described in Intervention 24 (West of Scotland Strategic Rail Enhancements);
- Improvements to stations to enhance the environment for passengers and increase car park capacity (e.g. Prestwick, Ayr, Troon, Glengarnock, Kilwinning).

Contribution towards the Scottish Government's Purpose

A.269 This intervention would provide a 'step-change' in rail service provision to the west and south west. This would result in a significant contribution to the objectives to increase rail capacity to Ayrshire and capacity and journey time to Inverclyde.

A.270 The feasibility of this intervention is dependent on being able to provide a solution to more platform capacity in central Glasgow to accommodate the services, as proposed in Intervention 24 (West of Scotland Strategic Rail Enhancements).

A.271 The improved services provide relief for the identified overcrowding issue on the south west electric services and give opportunity for modal shift from road to rail, particularly from Kilmarnock where the increased service frequency is high.

A.272 This intervention is expected to have a moderate positive environmental impact on air quality as a modal shift from road to rail is envisaged to reduce congestion leading to a contribution to improved air quality.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Deliverability

- A.276 The deliverability of the intervention is considered technically and operationally feasible. The intervention is highly dependent on being able to provide a solution to more platform capacity in central Glasgow to accommodate the services, e.g. through the conversion of the Cathcart Circle to Metro operation, through alternative proposals to divert services or to constructing additional capacity.
- A.277 Doubling the track along the Kilmarnock to Barrhead line would cause some closures during construction. Along the route there is approximately 3km between Kilmaurs and Kilmarnock affected by mining. With no viable diversion route this is likely to increase pressure on the road network into Glasgow during these periods.
- A.278 Some of the original trackbed between Paisley Canal Station and Elderslie has been sold and developed. This will make the process of returning the route to a twin-track railway more complex than it might otherwise have been. The extension of the Paisley Canal Line to Elderslie would provide an alternative route for Glasgow to Ayr passenger trains and freight traffic, including coal trains from Hunterston to Longannet. This could free up some capacity in the bottleneck area between Paisley and Shields. Providing additional capacity between Glasgow and Shields would be extremely challenging. Following construction, it is unlikely that any factors would adversely affect the operation of the increased service frequencies on railway services between Glasgow and Inverclyde during its projected life. However the doubling of the service frequency to Wemyss Bay over the single track branch line from Port Glasgow and the tight presentation times required at Paisley Gilmour Street would reduce journey time reliability and increase the impact from delays on other services.

27 – ENHANCEMENTS TO RAIL FREIGHT BETWEEN GLASGOW AND THE BORDER VIA WEST COAST MAIN LINE

Intervention description

A.279 This intervention would allow an increase in the number of freight paths on the West Coast Main Line between Glasgow and the Border by enhancing the rail infrastructure. This would include measures such as:

- Lengthening of loops;
- Removal of speed limits that are below 75 mph for freight trains;
- Increasing the loading gauge on the route; and
- Increasing freight terminal capacity.

A.280 This intervention may also include additional capacity between Mossend and Coatbridge.

A.281 Widening of the track cuttings in places may require land take, or the construction of earth retaining structures where space is limited.

Contribution towards the Scottish Government's Purpose

A.282 This intervention would improve capacity for rail freight between Scotland and England by providing enhanced facilities on the West Coast Main Line. This would contribute to the freight objective identified on Corridor 18 (Glasgow to North West England and the Border) to transfer freight from road to rail.

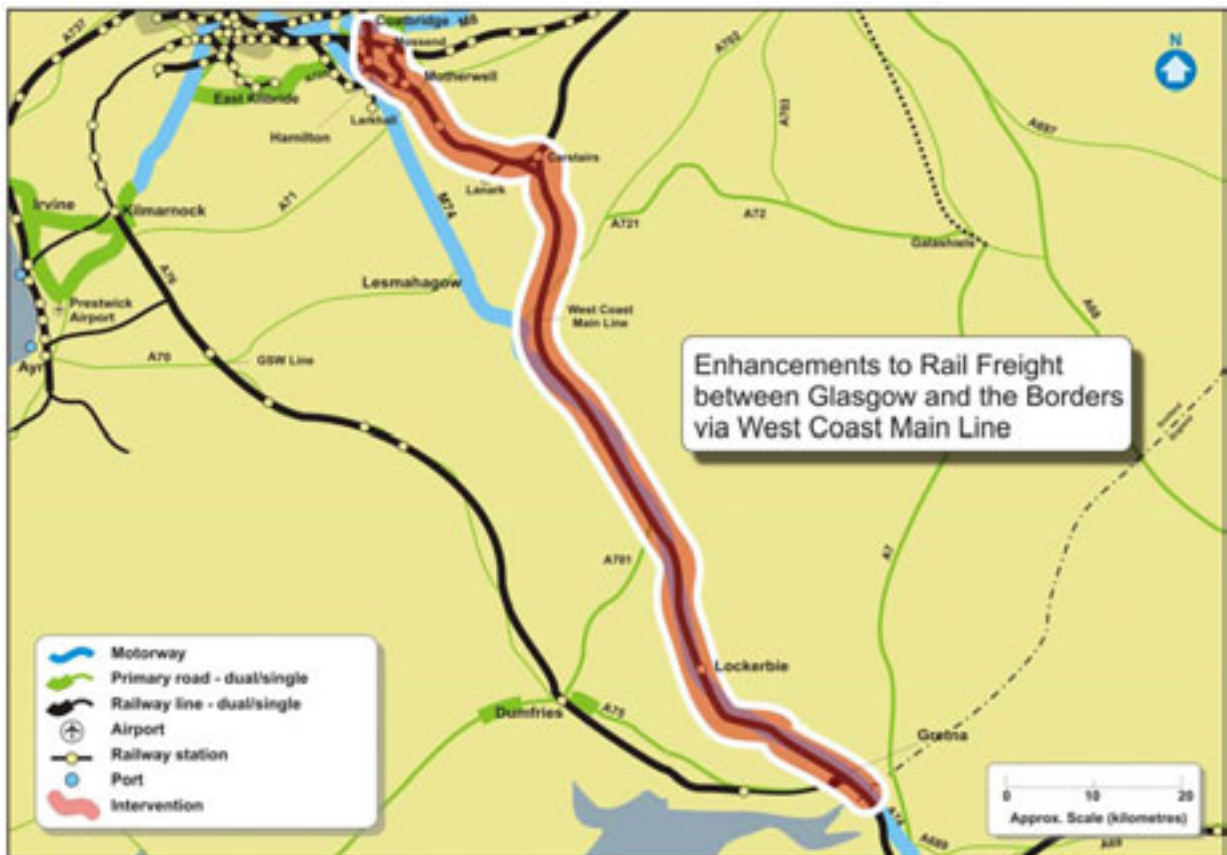
A.283 There would be environmental benefits by providing additional paths for freight trains as rail would be expected to capture a greater proportion of cross-border freight traffic thereby reducing road-related emissions. New rail infrastructure could adversely affect the environment; however, it is possible that any such impacts could be mitigated at project design level.

A.284 This intervention could interact with any similar proposals developed by the department for transport on the West Coast Main Line south of Carlisle.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.285 The significance of international rail freight access was highlighted in the National Transport Strategy (NTS) (Freight Action Plan and Scotland's Railways) and the National Planning Framework (NPF2).



Current status of project

A.286 There has been no detailed consultation specifically on this individual intervention; however it is expected that any measure which promotes modal shift to more sustainable transport would achieve overall public support.

Possible costs

A.287 Estimated costs for this intervention are estimated to be in the range £250m - £500m. This is substantially cheaper than the alternative intervention for enhanced freight capacity via the Dumfries route, leading to this intervention being preferred on the basis of affordability.

Deliverability

A.288 The deliverability of the intervention is considered technically and operationally feasible. There are a number of technical issues associated with this intervention which involve the increased paths for freight trains possibly requiring new track, improved signalling and new rolling stock. The rail line between Coatbridge and Mossend involves the need to cross the A8 which would affect existing road users during the implementation of this intervention.

A.289 During construction, the reduced capacity and available paths for West Coast Main Line could affect trains on this route and cause delays for existing users. The new enhancements would provide additional capacity and diversionary routes for rail freight. The provision of W12 Gauge would permit larger containers to be carried, maximising the use of limited freight paths.

28 – INVERKEITHING TO HALBEATH RAIL LINE

Intervention description

- A.290 This intervention supports the objective to maintain the 60-minute commutable labour market within Edinburgh at the current level and improve access to south Fife. It would also support the objective of promoting public transport journey time reductions between Aberdeen, Inverness, Perth and Edinburgh by reducing journey times between Inverkeithing and Ladybank.
- A.291 This intervention would consist of a direct double track rail link between Halbeath and Inverkeithing, including new junctions at Inverkeithing and Halbeath.

Contribution towards the Scottish Government's Purpose

- A.292 This intervention would reduce journey times between Edinburgh and Perth; and Inverness, Aberdeen and the Central Belt, although the reduction is unlikely to be significant. The greater journey time saving would be for freight, by providing a more effective link to the Rosyth port from the south, helping to support future development there.
- A.293 This would provide the ability to run more direct services to Edinburgh in conjunction with a strategic Park and Ride facility at Halbeath. The provision of a full Dunfermline loop would enable the segregation of local and intercity services and provide more efficient freight access to the port of Rosyth as trains would not be required to reverse to access the Rosyth branch from the Stirling / Alloa line.
- A.294 The National Planning Framework (NPF2) recognises that an effective (road and) rail infrastructure to support national and international connections by sea is essential to ensure that the critical role of ports in supporting and contributing to Scotland's business and economic health is fully realised. NPF2 does not specify the details of these links in the Inverkeithing and Rosyth area.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

- A.295 This intervention interacts with other strategies aimed at improving rail inter-city journey times (especially Edinburgh – Inverness on the Highland Main Line). It will require increased capacity between Edinburgh and Inverkeithing / Dunfermline (e.g. as proposed in the Network Rail Route Utilisation Strategy for Scotland) and would need to interface with the proposed restructuring of Edinburgh – Fife services in terms of the usage of this increased capacity.



Current status of project

A.296 This intervention has been formulated as part of the STPR, and is mentioned in the National Planning Framework. No other work has been carried out on the development of this intervention. However it is expected that any measure which promotes modal shift to more sustainable transport would achieve public support.

Possible costs

A.297 This intervention would require fairly significant new construction and land take. Costs for the intervention are estimated to be in the range £100m - £250m.

Deliverability

A.298 The deliverability of the intervention is considered technically and operationally feasible. It is expected that no untried techniques should be required when implementing any aspects of this intervention. However, as the design stages progress, localised issues may arise which would require increased technical capabilities to overcome.

29 – DUNDEE NORTHERN RELIEF ROAD

Intervention description

A.299 This intervention supports the objectives to reduce conflict between strategic and local traffic in Dundee, and to improve the connectivity of Aberdeen to the Central Belt.

A.300 Improvement to the A90 at Dundee could take the form of:

- A new Northern Peripheral Bypass road around Dundee from the A90 west of Invergowrie to the A90 north of Dundee; **or**
- Upgrading of roundabouts and associated junctions on the A90 Kingsway.

A.301 Both options could incorporate a package of associated bus priority, cycle lanes and pedestrian measures on or across the Kingsway.

Contribution towards the Scottish Government's Purpose

A.302 A new outer bypass would contribute significantly to the objective of reducing journey times between the Central Belt and Aberdeen, with an approximate reduction of 10-15 minutes, and by reducing the conflict between long distance and local traffic through removing up to 50 per cent of traffic from the Kingsway. This would have consequential environmental benefits for those living and working adjacent to the A90, and would enable the Kingsway to perform a role as a local distributor road with potential for the introduction of bus priority measures.

A.303 The outer bypass would have a potentially moderate benefit to Air Quality in Dundee's Air Quality Management Area (AQMA) by moving 50 per cent of the traffic away from the A90. It would be likely, however, to introduce adverse environmental impacts in the predominately rural landscape north of the city.

A.304 Alternatively, grade separation of all or some of the at-grade roundabouts on the A90 Kingsway would also contribute significantly to the two objectives above. While it may do so to a lesser extent, it would be expected to address the issues identified.

A.305 Although this option would avoid any environmental impact north of the city, provision of grade separated junctions in an urban area would have adverse impacts on the communities adjacent to the A90. The bypass route is expected to provide more value for money than the on-line upgrade.

	Safer & Stronger		Smarter		Wealthier & Fairer		Greener		Healthier
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Links to other strategies

A.306 The intervention was highlighted by the Tactrans Regional Transport Partnership.



Current status

A.307 Strategic roads users may view the bypass positively, and residents of Dundee may perceive benefits from its provision. Equally residents close to the proposed route may have reservations due to increased emissions, visual impact and noise pollution. The environmental impact associated with the outer bypass has prompted public criticism.

Possible costs

A.308 The total cost for this intervention is estimated to be in the range of £100m-£250m.

Deliverability

A.309 The deliverability of the intervention is considered technically and operationally feasible. The outer bypass would, however, impact negatively on the environment to the north of Dundee, which would require careful consideration. A significant body of opinion has been received objecting to the possibility of building a northern bypass. This has come from individuals, community groups and local agencies.

A.310 Although the option of upgrading the existing route would avoid this particular environmental impact north of the city, provision of grade separated junctions in an urban area could have adverse impacts on the communities adjacent to the A90. There are no significant operational issues anticipated from this intervention.

B SUMMARY OF STPR WORK PACKAGES

- B.1 The Strategic Transport Projects Review (STPR) has been developed over the course of five distinct work packages.
- Review Current and Future Network Performance;
 - Determine Expectations, Gaps and Shortfalls;
 - Identify Potential Interventions and Sift Options;
 - Appraise Candidate Interventions; and
 - Strategic Environmental Assessment.

REVIEW CURRENT AND FUTURE NETWORK PERFORMANCE

- B.2 In this work package, the strategic transport network was categorised, for the purpose of assessment, into 20 corridors, 4 urban networks (Glasgow, Edinburgh, Dundee and Aberdeen), and two strategic nodes (Perth and Inverness). This division offers the ability to address the most important impacts of each on the strategic transport network, while also offering the ability to compare results and offer an assessment applicable on a national basis.
- B.3 The historic and current performance of each element was then assessed using the Transport model for Scotland (TMfS) against the three key strategic outcomes in the National Transport Strategy⁴ (NTS):
- Improve journey times and connections, to tackle congestion and the lack of integration and connections in transport;
 - Reduce emissions, to tackle the issues of climate change, air quality and health improvement; and
 - Improve quality, accessibility and affordability, to give people a choice of public transport, where availability means better quality transport services and value for money or an alternative to the car.
- B.4 The expected future performance of the network up to the year 2022 was forecast, based on demand forecasts by mode and corridor/network/node.
- B.5 Effective transport is a key to supporting the delivery of the Government Economic Strategy. This work package concluded that for the most part, the transport network performed to a high standard and generally within its capacity, but a number of significant areas would require specific attention, including:
- A forecast increase in congestion in central Scotland, particularly around Edinburgh. This impacts on the connectivity between Scotland's major urban centres and the journey time reliability required to support business sustainability and growth;
 - The relative isolation of places outside of the Central Belt, of cities such as Aberdeen and Inverness (in spite of demand growth driven by urban regeneration and development in areas relatively remote from the Central Belt), and greater isolation for the more remote peripheral areas and islands. This impacts on the access to key services required to support the solidarity and cohesion aims;
 - A public transport network which served existing flows adequately, but which could perform better in terms of accessibility and integration; and

- A forecast growth in emissions resulting from growth in private car usage and a significant increase in freight transport by road.
- B.6 The focus of the remaining work packages has been on finding effective solutions to meet these challenges, ensuring that the transport system plays its full role in helping to deliver the Scottish Government's Strategic Objectives and overall Purpose to promote sustainable economic growth for Scotland.

DETERMINE EXPECTATIONS, GAPS AND SHORTFALLS

- B.7 This work package interpreted the findings from the review of current network performance. It did so by considering the findings from that review in the context of their potential impact on achieving national strategic objectives, derived from the Government Economic Strategy, National Transport Strategy etc. It assessed their significance, and developed a portfolio of specific objectives for the corridors, nodes and networks.
- B.8 The following national and corridor/network/node based objectives were identified. These objectives are designed to be consistent with the process of addressing expectations, gaps and shortfalls for the strategic transport network as a whole. The performance of the corridors, networks and nodes were considered in light of the national objectives. This informed the development of the corridor/network/node objectives.

National

- Promote 'competitive' inter-urban journey times;
- Reduce inter-urban journey time on public transport;
- Promote journey time reduction on the trunk road network for prioritised vehicles and users (e.g. high occupancy vehicles, freight, bus) where STAG appraisal demonstrates that a strong economic case can be balanced with environmental objectives. Elsewhere on the trunk road network provide improvements to journey time reliability;
- Promote journey time reductions between the central belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres;
- Maximise the labour catchment area in city regions where economic evidence demonstrates that this is required (favouring public transport and high occupancy vehicles and balancing with other policy measures that promote reduction in need to travel i.e. planning policy);
- Support the development and implementation of relevant proposed national developments identified in the NPF2;
- Reduce CO₂ emissions per person km;
- Stabilise total CO₂ emissions;
- Reduce CO₂ emissions in line with expectations from the [then] emerging climate change bill;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network, recognising the need to continue the work of the Strategic Road Safety Plan through the STPR period;
- Promote seamless travel;
- Improve the competitiveness of public transport relative to the car; and
- Improve overall perceptions of public transport.

Aberdeen

- To improve accessibility, primarily by public transport, to and between the City Centre, Dyce, the airport and South East Aberdeen;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between the Aberdeen and the Central Belt primarily to allow business to achieve an effective working day when travelling between these centres.

Dundee

- To reduce the conflict between longer distance and local traffic;
- To improve bus/rail interchange opportunities;
- To improve the public transport accessibility and competitiveness to Dundee West;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between Aberdeen and the Central Belt primarily to allow business to achieve an effective working day when travelling between these centres.

Edinburgh

- To maintain the 60-minute commutable labour market area at the current level, with a particular focus on linking areas of economic activity;
- To enhance public transport interchange opportunities, where feasible to do so;
- To increase public transport capacity and frequency between Fife and Edinburgh;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network;
- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres; and
- To promote efficient and effective transport links to support the development and implementation of the proposed national development at Edinburgh Airport identified in the National Planning Framework (NPF2).

Glasgow

- To increase the public transport access to and between areas of economic activity and regeneration with minimal need for interchange;
- To improve the efficiency of the M8 motorway during periods of peak demand with a focus on reducing the conflict between longer distance and local traffic, increasing the people carrying capacity and freight carrying capacity of existing road, and demand management;
- To address rail capacity and connectivity issues in central Glasgow;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network;

- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres; and
- To promote efficient and effective transport links to support the development and implementation of the proposed national development at Glasgow Airport identified in the NPF2.

Inverness

- To reduce the conflict between longer distance and local traffic;
- To improve connectivity, particularly by public transport between Inverness city centre and the growth area to the east including Inverness Airport;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between Inverness and the Central Belt primarily to allow business to achieve an effective working day when travelling between these centres.

Perth

- To contribute to reducing the emissions per person kilometre;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres.

Corridor 1 – Inverness to Wick/Thurso and Northern Isles

- To enhance public transport accessibility and reduce public transport journey time to and from Inverness; and
- To reduce the fatal and severe accident rates to the national average or lower.

Corridor 2 – Inverness to Ullapool and Western Isles

- To reduce the accident, fatal and severe rates to the national average.

Corridor 3 – Inverness to Fort William

- To reduce the accident rate to current national average without adversely impacting on accident severity (see also Corridor 7).

Corridor 4 – Aberdeen to Inverness

- To improve connectivity, particularly by public transport between Inverness city centre and the growth area to the east including Inverness Airport;
- To improve journey time and increase opportunities to travel, particularly by public transport, between Aberdeen and Inverness; and
- To reduce the accident rate and severity rate to current national average.

Corridor 5 – Dundee to Aberdeen

- To improve the public transport competitiveness between Aberdeen and Dundee (and hence onwards to the Central Belt);
- To contribute to reducing both overall emissions and emissions per person kilometre through providing for alternatives to road freight movement on the corridor;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen primarily to allow business to achieve an effective working day when travelling between these centres.

Corridor 6 – Inverness to Perth

- To reduce journey time and increase opportunities to travel between Inverness and Perth (and hence onwards to the Central Belt);
- To improve the operational effectiveness of the A9 as it approaches Perth and Inverness;
- To address issues of driver frustration relating to inconsistent road standard, with attention to reducing accident severity; and
- To promote journey time reductions, particularly by public transport, between the Central Belt and Inverness primarily to allow business to achieve an effective working day when travelling between these centres.

Corridor 7 – Glasgow to Oban / Fort William

- To provide improved road standards and overtaking opportunities; and
- To reduce accident severity to the national average.

Corridor 8 – Aberdeen to North East Scotland and Northern Isles

- To promote continuing reduction in accident rates and severity rates across the strategic transport network.

Corridor 9 – Glasgow to Perth

- To address current and forecast rail overcrowding into Glasgow;
- To improve the efficiency and reliability of the operation of the southern sections of the M80 on approach to Glasgow, particularly for priority vehicles;
- To reduce the severity of accidents to the national average; and
- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres.

Corridor 10 – Edinburgh to Stirling

- To improve access to Grangemouth port and freight hub;
- To address shortfalls in the provision of public transport to and from Edinburgh and increase public transport modal share;

- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote efficient and effective transport links to support the development and implementation of the proposed national developments at Grangemouth and Edinburgh Airport identified in the NPF2.

Corridor 11 – Perth to Dundee

- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote journey time reductions, particularly by public transport, between the Central Belt and Aberdeen primarily to allow business to achieve an effective working day when travelling between these centres.

Corridor 12 – Edinburgh to Perth

- To reduce Edinburgh to Perth public transport journey times and increase opportunities to travel by public transport;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network;
- To promote journey time reductions between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres;
- To promote efficient and effective transport links to support the development and implementation of the proposed national developments at the Forth Crossing and Edinburgh Airport identified in the NPF2; and
- To improve the efficiency of the M90/A90 during periods of peak demand with a focus on reducing the conflict between longer distance and local traffic.

Corridor 13 – Glasgow to Edinburgh

- To increase public transport capacity and reduce journey time between Edinburgh and Glasgow;
- To make best use of the available road space and better manage peak demand;
- To increase public transport capacity and frequency between Livingston and Edinburgh;
- To contribute to both a reduction in emissions per person kilometre and a reduction in overall emissions;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To promote efficient and effective transport links to support the development and implementation of the proposed national developments at Grangemouth and Edinburgh Airport identified in the NPF2.

Corridor 14 – Edinburgh to Dundee

- To reduce public transport journey time between Edinburgh and Dundee;
- To increase public transport capacity and frequency between Fife and Edinburgh;
- To promote journey time reductions between the Central Belt and Aberdeen/Inverness primarily to allow business to achieve an effective working day when travelling between these centres;

- To promote efficient and effective transport links to support the development and implementation of the proposed national developments at the Forth Crossing and Edinburgh Airport identified in the NPF2;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To improve the efficiency of the M90/A90 during periods of peak demand with a focus on reducing the conflict between longer distance and local traffic.

Corridor 15 – Glasgow to Stranraer and South West

- To increase rail capacity between Ayrshire and Glasgow including the Kilmarnock line;
- To ensure efficient and effective freight access to the port facilities at Loch Ryan;
- To promote continuing reduction in accident rates and severity rates across the strategic transport network; and
- To reduce the conflict between longer distance and local traffic with a focus on identified key constraint points.

Corridor 16 – Stranraer to North West England

- To ensure efficient and effective freight access to the port facilities at Loch Ryan; and
- To promote continuing reduction in accident rates and severity rates across the strategic transport network.

Corridor 17 – Glasgow to Inverclyde and Islands

- To increase capacity and reduce journey times by public transport between Glasgow and Inverclyde;
- To facilitate freight access to Greenock port;
- To improve the efficiency of the A8/M8 during periods of peak demand with a focus on reducing the conflict between longer distance and local traffic;
- To reduce the accident rate to the national road type average on the M8 and A8; and
- To promote efficient and effective transport links to support the development and implementation of the proposed national development at Glasgow Airport identified in the NPF2.

Corridor 18 – Glasgow to North West England and Beyond

- To make best use of the available road space and better manage peak demand taking into account the need to contribute to emissions reduction;
- To contribute to emissions reduction by facilitating an increase in the proportion of freight passing through the corridor that is carried by rail; and
- To promote continuing reduction in accident rates and severity rates across the strategic transport network.

Corridor 19 – Edinburgh to North West England and Beyond

- To promote continuing reduction in accident rates and severity rates across the strategic transport network.

Corridor 20 – Edinburgh to North East England and Beyond

- To increase the attractiveness and capacity of public transport into Edinburgh to reduce crowding and forecast road congestion; and
- To promote continuing reduction in accident rates and severity rates across the strategic transport network.

IDENTIFY POTENTIAL INTERVENTIONS AND SIFT OPTIONS

- B.9 This work package provided an initial assessment of some 2,000 potential transport interventions from a range of sources, to demonstrate their potential to meet the corridor / network and strategic transport objectives, and their consistency with overall government policy. The interventions developed took cognisance, where appropriate, of those interventions which had already been proposed in previous studies, such as the draft Regional Transport Strategies. This was supplemented by new proposals resulting from consultation with stakeholders and assessment of the issues in each corridor by professional transport planners and engineers.
- B.10 The list of interventions generated was subject to an initial sifting process to ensure consistency with overarching National and corridor / network objectives. Those interventions which met these sifting criteria were grouped into appropriate packages where appropriate, particularly where more than one intervention was required to deliver a route based objective.
- B.11 The output from this initial assessment was a list of approximately 150 potential interventions, some of which were expressed in very high level terms, reflecting their current stage of development. These were then taken forward for more detailed specification and appraisal.

APPRAISE CANDIDATE INTERVENTIONS

- B.12 The purpose of this work package was to appraise the potential interventions which were brought forward from the initial option development and sifting. The appraisal used the methodologies and criteria in the Scottish Transport Appraisal Guidance (STAG) which are designed to measure the deliverability and feasibility of proposed interventions in the context of the policy, economic and transport objectives which they seek to address. STAG provides a rigorous process for testing proposals, and the key elements of the process are set out in Figure 1.1 of the STAG document⁴⁴.
- B.13 The Transport Model for Scotland was used to quantify the transport impact of the packages, providing a consistent appraisal tool within the STAG framework. The outputs of this work package provided the basis for the recommendations presented in this Summary Report.

⁴⁴ Scottish Transport Appraisal Guidance, The Scottish Government, June 2008

STRATEGIC ENVIRONMENTAL ASSESSMENT

- B.14 This work package provides a Strategic Environmental Assessment of the entire process, from the identification of the issues through to the appraisal of the interventions. The assessment provides further evidence to support the decision making process as to which interventions should be taken forward into this investment portfolio. In accordance with the Environmental Assessment (Scotland) Act 2005, the Environmental Report, produced as part of this work package has been subjected to a statutory consultation process, alongside the draft recommendations of the STPR.
- B.15 A post adoption statement and supporting material have been published separately.

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