



TRANSPORT
SCOTLAND
CÒMHDHAIL ALBA

Inverness to Aberdeen Corridor Study

A96 Dualling Inverness to Aberdeen
Strategic Business Case
September 2014

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1.1 Context of the Study

The Scottish Government's Strategic Transport Projects Review (STPR), published in 2008, set out a number of transport priorities for the Inverness to Aberdeen corridor to be met by 2032. These transport priorities included: rail enhancements, new stations at Kintore and Dalcross, strategic park and ride at Dyce, upgrading of the A96 to dual carriageway between Inverness and Nairn, a bypass of Nairn, a new bridge at Inveramsay, and a targeted programme of measures to reduce accident severity.

In December 2011, The Agenda for Cities, "Scotland's Cities: Delivering for Scotland", was published by the Scottish Government. The purpose of this document was to set out the vital contribution that Scotland's major population centres can make in delivering the Government Economic Strategy. The Agenda identifies connecting cities with strong, reliable and resilient transport infrastructure as a key characteristic to support growth. Published alongside this was the Scottish Government's Infrastructure Investment Plan, providing an overview of plans for infrastructure investment over the coming decades. To complement the Agenda for Cities, the investment plan contains a commitment to complete the dual carriageway network between all Scotland's cities by 2030.

This focus on developing and promoting economic growth through Scotland's cities and their regions is reflected in current thinking for planned development along the corridor through Local Development Plans which have ambitious growth aspirations. Furthermore, the National Renewables Infrastructure Plan has identified Aberdeen, Peterhead, Ardersier and Nigg as key locations to enable Scotland to reap the economic benefits resulting from the offshore renewable energy potential. Connectivity to the central belt of Scotland, the rest of the UK markets, and access to labour force is critical to the success of the region.

It is in this context that this Strategic Business Case for the A96 Dualling Programme has been developed. This builds upon the evidence base of the STPR and seeks opportunities to address the growing economic and transport demands along the corridor.

1.2 Approach

The appraisal of the 160km Inverness to Aberdeen strategic transport corridor (**Figure 1-1**) focuses on the performance of the trunk road and rail network between the cities of Inverness and Aberdeen. The transport corridor is underpinned by the A96 Trunk Road and the Inverness to Aberdeen Rail line. Both serve all of the major towns along the route.



Figure 1-1: The Inverness to Aberdeen Corridor

The appraisal has been undertaken in accordance with an evidenced based approach outlined in the Scottish Transport Appraisal Guidance (STAG). This Strategic Business Case (SBC) summarises the outcome of the appraisal and covers:

- the strategic case;
- identification of the key problems, issues, and opportunities on the corridor;
- development of transport planning objectives for the study;
- options to be taken forward to the appraisal process; and
- results of the appraisal process.

Throughout the appraisal process, stakeholder engagement was undertaken with The Highland Council, The Moray Council, Aberdeenshire Council, Aberdeen City Council, the Regional Transport Partnerships (Nestrans and HITRANS) and the Aberdeen City and Shire Strategic Development Planning Authority.

2.1 Strategic Policy Context

The **National Transport Strategy**, published in 2006, was the first strategy of its kind to set out the long term vision for Scotland's transport policies with the aim of creating a safe, integrated and reliable transport system that supports economic growth and meets the needs of everyone in Scotland. One of the key aspects of the strategy was the identification of three Key Strategic Outcomes of **"improve journey times and connections, reduce emissions, and improve quality, accessibility and affordability"** with the intention that these would set the framework for developing future transport policy.

The **Strategic Transport Projects Review (STPR)** was undertaken within the policy framework outlined in the National Transport Strategy. Published in 2008, the STPR set out 29 investment priorities within an investment hierarchy for the 20 year period following the programme in place at that time. This programme was identified as a means of supporting the Scottish Government's Purpose of *"creating a more successful country, with opportunities for all to flourish through increasing sustainable economic growth"*. The STPR included the examination of 20 strategic corridors, including Aberdeen to Inverness, and identified evidence based options and priorities for intervention. The Key Strategic Outcomes introduced in the National Transport Strategy were used as the basis for identifying 13 national objectives. The Review recommended a number of road and rail based interventions to take forward on the Aberdeen to Inverness corridor, many of which are currently being progressed by the Scottish Government.

2.2 Delivering the Strategic Needs

The connections between Inverness and Aberdeen form key components of the national strategic transport network. Upgrading of the connections will contribute to the delivery of a number of strategic objectives which are aligned to the policies and plans outlined above, as shown in **Figure 2-1**.

Linking the strategic case to the national policy framework

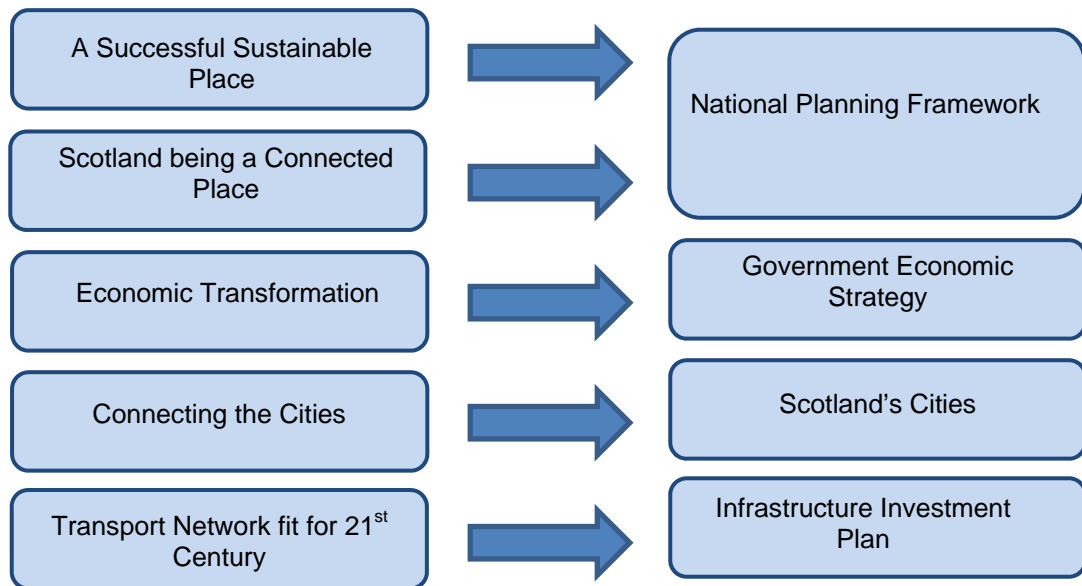


Figure 2-1: Delivering the Sustainable Economic Growth

2.2.1 A Successful, Sustainable Place

The National Planning Framework 3 (NPF3), published in 2014, provides the spatial manifestation of the Government Economic Strategy and the Scottish Government's plans for infrastructure development. The Framework recognises that whilst the cities are at the core of their regions, the towns are also important centres where many people live and work. The aim is to improve the standard of living for the entire population, allowing everyone to take advantage of the economic prosperity.

Further investment in the Inverness to Aberdeen transport corridor would significantly improve connections between the towns and the rural communities along the A96. Investment to reduce the conflict between local and strategic transport along the route would make the towns more accessible for locals and increase opportunities for active travel. This would help to distribute opportunities fairly between, and within, our communities, reflecting the diversity and strengths along the corridor.

2.2.2 Scotland Being a Connected Place

The National Planning Framework also recognises that investments in infrastructure are key to ensuring the competitiveness of places. It recognises that these connections are needed to "strengthen international links, tackle congestion, reduce journey times between our cities and support our rural communities". The Framework highlights that connections within Scotland are crucial and that some of the strategic road network would benefit from upgrading to support this aim.

Rural areas of Scotland already “support a number of economic sectors, including tourism, food and drink, and other primary industries¹.” It is expected that more people will live and work in the rural areas of the country as digital links and opportunities for remote working continue to grow. The whole country has access to high-speed fixed and mobile digital networks, so this shouldn’t hinder the development of rural areas. By upgrading the transport links along the corridor, the rural areas will be better connected to the main economic areas in the north and north-east of Scotland. Combining this with improved digital links will connect the rural areas to the economic centres, providing more opportunities to live and work in rural areas.

2.2.3 Economic Transformation

The Government Economic Strategy (GES) was originally developed in 2007. It recognises that an efficient transport system is one of the key enablers for enhancing productivity and delivering faster, more sustainable growth. It is regarded as a key element of the Scottish Government’s overall strategy for infrastructure investment.

The Strategy was updated in 2011 to accelerate Scotland’s economic recovery following the 2008 financial downturn. This built upon the strategic priority of infrastructure development and place set out within the 2007 document. It focussed on the development of Scotland’s transport networks to increase connectivity between communities in order to maximise Scotland’s capacity for all areas, including city, town and rural regions, to contribute and benefit from faster sustainable economic growth.

Aberdeen is a key driver of the Scottish economy, is the energy capital of Europe, is recognised as a global centre of excellence for the subsea industry and renowned for its technology and skills. The area has above-average incomes, low unemployment and a high quality of life. Inverness is the capital of the Highlands and is the fastest growing city in Scotland. The potential of renewable energy resources in the Highlands and surrounding coastal areas is unprecedented.

In line with the commitment to reduce social and spatial inequalities in Scotland, the opportunities afforded by upgrading the transport connections, such as improved access and connectivity to the established energy sector, will ensure the region is better connected, better prepared and more able to compete effectively in the global marketplace.

2.2.4 Connecting the Cities

“Scotland’s Cities: Delivering for Scotland”, was also published in 2011 to complement the Government Economic Strategy. “Scotland’s Cities” highlighted that the successful cities are linked by key growth supporting characteristics including being “connected cities, with strong digital and transport infrastructure”. Connectivity, both within and between cities, is of particular relevance in this case, as is reduced journey times between the cities. “Scotland’s Cities” also recognised that there is a “need to work collaboratively [between cities] to optimise growth for the benefit of the whole of Scotland” and that the “investment in infrastructure... is a key driver of both short term and long-term economic growth and performance”.

¹ National Planning Framework 3. 2014

Perth to Inverness and Inverness to Aberdeen are the only cities that are currently not linked by at least a continuous dual carriageway and a twin-track railway from end to end. There are opportunities to improve the connectivity of the cities in the north and north-east of Scotland and also to provide improved connections between the towns along the corridor.

2.2.5 A Transport Network fit for the 21st Century

The Infrastructure Investment Plan was published in 2011 and sets out the Government's plans for infrastructure investment over the coming decades, explaining why infrastructure is seen by the Scottish Government as being a key driver of both short and long-term economic growth. The IIP commits to completing the dualling of the road network between Scotland's cities by 2030, including between Inverness and Aberdeen.

With the expected economic growth in Inverness and Aberdeen and both cities planning to expand along the corridor, the current transport connections will not be sufficient. The road network should be designed to modern standards, improving the road layout and safety along the corridor. Investing in the road network would increase the resilience of the network, allowing it to cope with incidents and ongoing maintenance. This will allow for more reliable journey times on the corridor which will result in increased economic activity.

The Scottish Government's policy documentation has developed in accordance with evolving strategies put in place to contribute to delivering the Scottish Government's Purpose of "increasing sustainable economic growth". The Key Strategic Outcomes, introduced as part of the National Transport Strategy, provide the framework to support the Government's Purpose. The Government Economic Strategy recognised that an efficient transport system is one of the key enablers for enhancing productivity and delivering faster, more sustainable growth.

The Infrastructure Investment Plan later committed to completing the dualling of the road network between Scotland's cities by 2030, including between Inverness and Aberdeen.

The "Scotland's Cities" report recognised that successful cities are linked by key growth supporting characteristics including being "connected cities, with strong digital and transport infrastructure". Connectivity, both within and between cities, is of particular relevance in this case, as is reduced journey times between the cities.

Over this period the National Planning Framework has developed and continues to recognise the requirement to "strengthen international links, tackle congestion, reduce journey times between our cities and support our rural communities" in order to meet the Scottish Government's Purpose.

2.2.6 Local and Regional Policy Context

The corridor falls under two Regional Transport Partnership areas and four local authorities. Current regional and local policies in the context of the corridor have evolved to incorporate a greater focus on connectivity, with aims to “improve the interconnectivity of the whole region”, provide an “integrated and efficient transport system” and create a “socially inclusive society”. As such although these policies are aimed at a more localised area they complement the overarching direction of the national policies towards delivering sustainable economic growth.

2.3 Summary of Problems and Opportunities

A review of the strategic economic opportunities along the corridor and how these align to the policy framework has been undertaken. A further review covered the operational and safety aspects impacting on the local and regional economy, the demand for travel and the associated level of connectivity within the corridor and the cities at either end. Finally, the Tier 1 Strategic Environmental Assessment Report presents details of the appropriate environmental baseline on the corridor².

The findings from this review were discussed with the stakeholders, as listed within Section 1.2, who subsequently contributed to the formulation of issues, problems and opportunities along the corridor.

2.3.1 Population and Employment Trends

Aberdeen and Aberdeenshire have both shown strong population growth in recent years and are key drivers of the Scottish economy. Gross Value Added (GVA)³ has increased in real terms in recent years and GVA per head and per employee are substantially above the Scottish average. Strong population growth has also occurred in the Inverness and Nairn area in recent years. Despite a more modest reduction in GVA in Inverness and Nairn between 2008 and 2011, compared to Scotland as a whole, GVA per head remains 85 per cent of the Scottish figure.

Population projections available for the four corridor local authorities for the period of 2010 to 2035 show that Aberdeen and Aberdeenshire Councils are projecting an increase of over 20 per cent, compared to the national average of 10 per cent; The Highland Council is projecting an increase of 15 per cent; and The Moray Council is projecting a similar level of increase to the national average. At a cumulative level the corridor is therefore projected to have an increase in population in excess of the national projections.

In contrast to the local authority projections, the Transport, Economic and Land-Use Model of Scotland (TELMOS) forecasts a much lower level of growth along the corridor. This is a result of the relatively poor levels of accessibility compared to other areas of Scotland resulting in those other areas being considered to be more attractive.

² A96 Dualling Programme, Strategic Environmental Assessment, Tier 1 Environmental Report, Transport Scotland, September 2014.

³ Gross Value Added (GVA) is a measure of the value of goods and services produced in an area.

Table 2-1 below shows the relative levels of growth by area comparing the local authority projections and those forecast by TELMOS.

Area	Percentage Growth in Population %	
	Mid-year estimates and Scottish Neighbourhood Statistics (2010-2035)	TELMOS (2012-2032)
Aberdeen	25	2
Aberdeenshire	22	3
Moray	10	-1
Highland/Inverness and Nairn	15	7

Table 2-1: Comparison of Population Growth Forecasts

Employment along the corridor fell by almost one per cent between 2008 and 2011, but this masks a larger reduction in Aberdeen, Moray and Inverness and Nairn being balanced by a large increase in employment in Aberdeenshire. Both Aberdeen and Aberdeenshire experienced an increase in employment in oil related activities, but while professional, scientific and technical employment increased in Aberdeenshire, there was a decline in Aberdeen. Aberdeenshire also experienced a large increase in business administration and support services. Education, health and other services lost employment in Aberdeen. These levels of growth are in comparison to a decrease of over five per cent at a national level.

Figure 2-2 shows the importance of different industries in each area using Location Quotient (LQ) analysis⁴. LQs can be used to highlight concentrations of employment by industry and whether employment in an area is over or under represented in a particular industry relative to the Scottish economy.

⁴ A Location Quotient of one indicates that the area has the same proportion of employment concentrated in a particular industry as the average across Scotland as a whole. A LQ of more than one indicates that the area is over represented in that industry while an area is under represented in an industry if the LQ is less than one.

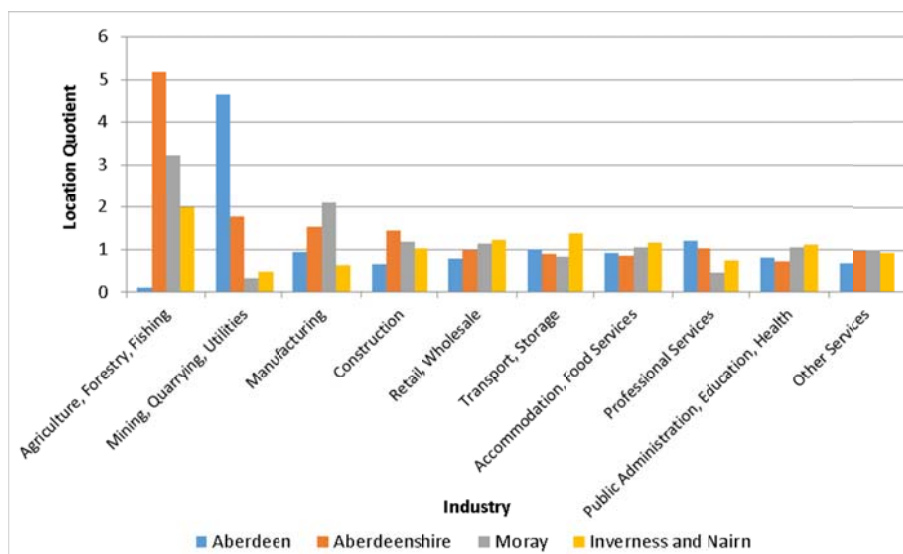


Figure 2-2 Location Quotients by Industry and Area⁵

This reflects the importance of the agriculture, forestry and fishing activities compared to the rest of Scotland, with the exception of Aberdeen, with the corridor having relatively high proportions of employment in these areas. Aberdeenshire has a particularly high concentration of employment in fishing and aquaculture in addition to a concentration of employment in forestry and logging and crop and animal production and hunting and related service activities, as do Moray and Inverness and Nairn. The importance of the oil industry is also highlighted within the LQ for mining, quarry and utilities, being more than four times the Scottish average. As indicated above, manufacturing is important to the Moray economy with food and drink production, clothing and wood products being particularly important.

2.3.2 Strategic Economic Opportunities

Inverness Existing and Future Opportunities

Inverness, "the city in the Highlands", was granted city status in 2000 and is the fastest-growing city in Scotland. It is an important centre for trade and commerce as well as being an important transport hub for the wider Highlands and Islands region. Although renowned for tourism, new industries have been developing in the city. Key economic sectors include energy, tourism and life sciences. The city is developing an expertise in renewables, with two of Scotland's leading wave and tidal companies based there and plans recently announced to transform the former oil fabrication yard at nearby Nigg into a major hub for the energy sector employing up to 2,000 people. Similarly the National Renewables Infrastructure Plan sets out the potential for the Ardersier fabrication yard to the east of the city. Inverness is a gateway to many of Scotland's major tourism destinations as well as developing as a centre of excellence in the treatment of diabetes. The city is also home to the headquarters of Scotland's newest university, the University of the Highlands and Islands, which was granted a university charter in 2011.

⁵ Business Register and Employment Survey

Inverness aims to enhance the attractiveness of the city centre as a focal point for the Highlands through the promotion of key development opportunities and to establish itself as a university city over the next decade:

- The £100m Beechwood Campus development for the University of the Highlands and Islands and other key partners should lead to the creation of 6,000 jobs over the next 30 years;
- The Centre for Health Science reflects the ambitions of Inverness to be a centre for research and development in medical devices and bio-technology. This £23m centre in the grounds of Raigmore Hospital includes among its tenants the University of the Highlands and Islands Diabetes Institute, the University of Stirling, NHS Education for Scotland and the Centre for Rural Health. The centre also has plans to expand onto the Inverness campus; and
- A number of key ports and industrial sites around the Moray and Cromarty Firths – including Ardersier, Nigg, Highland Deephaven and Invergordon – are well-placed to take advantage of investment in the energy sector, both in renewables and in oil and gas. The Nigg yard is part of the Low Carbon/Renewables North Enterprise area. “Scotland’s Cities” states that their development will go hand in hand with the continuing protection of the special environment of the Firths.

Aberdeen Existing and Future Opportunities

Aberdeen achieves well above its size in economic contribution to both Scotland and the UK and is Europe's energy capital. Globally, it has the 2nd highest concentration of offshore energy expertise after Houston, Texas, and it is home to multi-national operators and contractors as well as many Scottish supply and service companies. It is recognised as a global centre of excellence for subsea and renowned for its technology and skills, which are supported by two Universities and two colleges of further education. The energy industry supports a thriving business community with a robust professional and financial services sector, while tourism, food and drink, life sciences and creative industries are also well represented in and around Aberdeen.

Aberdeen and its wider city region is well-placed to take advantage of continued exploration of North Sea oil and gas reserves and to develop its expertise in serving this sector, and the growing renewable energy sector. Opportunities from oil and gas reserves West of Shetland, from decommissioning existing infrastructure and from the deployment of offshore renewables will become increasingly important.

The city is a vital transport hub between the northern isles of Orkney and Shetland and mainland Scotland. Aberdeen's harbour and airport are not only important transport links to these communities and the North East of Scotland, but are vital conduits for commerce and trade. The NPF3 designates Aberdeen Harbour as a nationally important facility which supports the oil and gas sector, provides international and lifeline connections and makes a significant contribution to the wider economy of the north east. Harbour expansion is expected to come forward during the lifetime of NPF3 including new harbour facilities and onshore transport links. Similarly, Strategic Airport Enhancements, including at Aberdeen, are designated a national development providing lifeline air links and reflects the role of airports as hubs for wider investment and business development.

Extending from Aberdeen northwards to Peterhead is the 'Energetica' corridor, where a key hub for energy infrastructure and related development is planned. While outwith the study area, synergies with other similar industries within the Inverness to Aberdeen Corridor should be considered within the study.

The Cities Strategy indicates that the greatest economic and employment growth opportunities for the city will derive from:

- capitalising on a knowledge-based economy and high quality digital infrastructure: utilising the skills developed in the North Sea in engineering and design, project management, and the successful deployment of resources in harsh environments;
- broadening its industry base from North Sea oil and gas exploration and production, to an energy industry with an international supply chain growing its exports of oilfield goods and services, such as subsea;
- embracing renewable energy as a rapidly expanding market, focusing on marine renewables, supporting the Energetica corridor development from Aberdeen northwards, aspiring to be a world-leading hydrogen city and a centre of excellence in operations and maintenance;
- building and capitalising on the skills of its universities and research and development in life sciences and telemedicine; and
- increasing the attractiveness of Aberdeen as a vibrant and dynamic City and investing in its city centre as it aims to be recognised as a UK City of Culture.

Moray and Rural Towns and Areas - Existing and Future Opportunities

Outwith cities, rural areas support a number of economic sectors, including tourism, food and drink and other primary industries. Many towns along the Inverness to Aberdeen corridor support clusters of services, have a significant share of homes and jobs, and act as transport hubs for a much wider rural community. The NPF3 states that a sustainable, economically active rural area, which attracts investment and supports vibrant, growing opportunities is essential to the NPF3 vision. The collective national importance of Scotland's rural towns and villages is also recognised.

Moray is home to world renowned brands in food and drink such as Walkers, Baxter's, Speyside whisky and the individual distillers associated with it. The importance the region plays in the national whisky sector is highlighted by the fact that over half the working distilleries in Scotland are located in Moray⁶. Tourism is also a key industry within the Inverness to Aberdeen corridor incorporating, and being adjacent to, significant natural and industrial tourism assets, including the Cairngorms National Park and Royal Deeside.

Providing synergies with other life science activities on the Inverness to Aberdeen Corridor, the Forres Enterprise Park forms part of a Life Sciences Enterprise Area. Building on University status and the completion of the Moray Life Science Centre, Moray's education and health resources form a platform for innovation across all of its

⁶ Highlands and Islands of Scotland European Partnership, accessed May 2014, <http://www.hiep.org.uk/about-us/members/moray-council/>

key sectors. Moray can play a lead role in the development of Scotland's E-health sector. The Strategy also highlights a well established and developing social economy sector with high levels of engagement which can provide a resource to build capacity in service delivery and in product and service development in key sectors.

Elgin's important role as a regional leader, providing a good range of services was recognised in the 'City of the Future Study' published in 2011. Its vision is to stimulate business development, diversification and innovation. Key initiatives include a 'high street first' approach to regeneration, innovation in technology and business, education and health, the visitor economy and arts, culture and heritage. Elgin will continue to act as an important transport hub. Marine renewables could provide opportunities for economic diversification in the area around Elgin. Nearby Buckie and Fraserburgh have potential as an operational and maintenance base for offshore renewable energy development in the Moray Firth, and a grid connection will come onshore at Portgordon and connect to the network at Blackhillock, near Keith.

Linking the energy sectors within the study area and improving the quality of place within towns is highlighted within the NPF3. In addition, linking other strategic development in the Government's Key Sectors also provides future opportunities. **Figure 2-3** shows the key locations within the vicinity of the corridor which will contribute towards a successful sustainable place, a low carbon place, a natural, resilient place, a connected place and the national developments, as detailed in the NPF3.

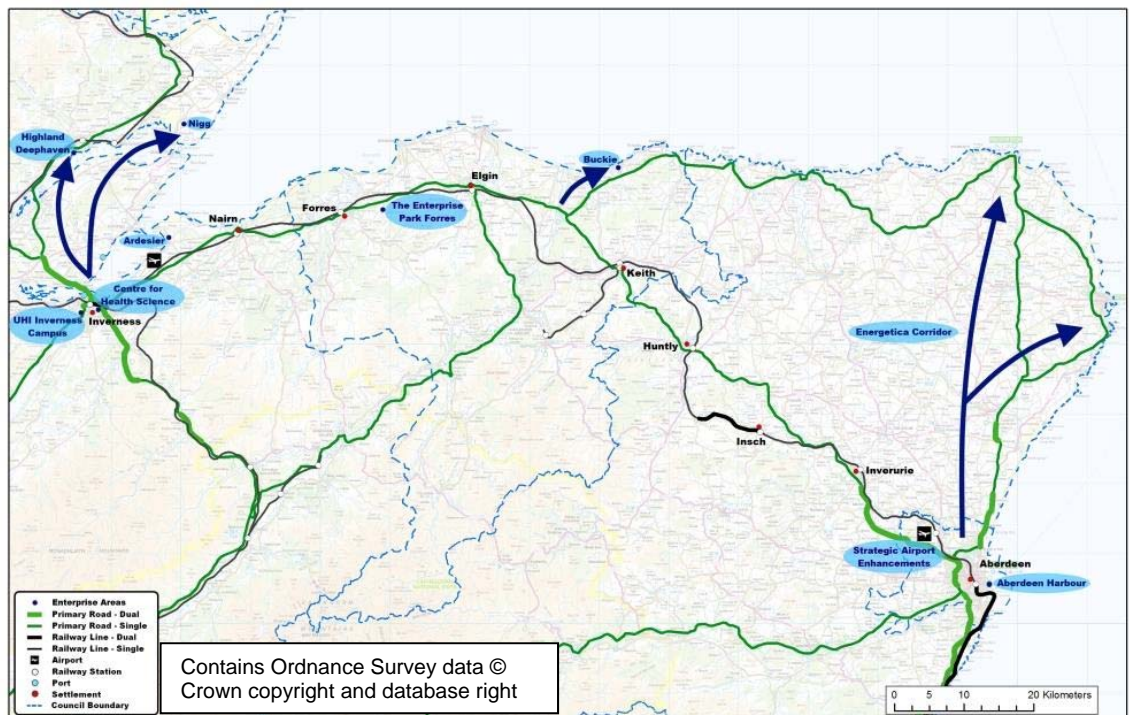


Figure 2-3: Key Areas on Corridor identified for Future Development in NPF3

2.3.3 How the Transport Corridor Performs

This review of the Inverness to Aberdeen corridor has identified a number of issues relating to the operational performance of the A96 Trunk Road and the Inverness to Aberdeen rail network. The review made best use of available data, collected from a variety of sources, including Transport Scotland, previously published reports, the Transport Model for Scotland (TMfS:12) and the Transport, Economic and Land-Use Model of Scotland (TELMOS).

Economy: Business surveys, undertaken by the Scottish Council for Development and Industry (SCDI) focussed on questions relating to the potential impact that dualling the A96 would have on businesses, and also provides an insight to the existing performance of the A96 from the perspective of business needs. Although the surveys are aimed only at businesses, and were undertaken in the context of A96 Dualling, the findings are considered useful in understanding the performance of the corridor for an important section of its users. The primary concern of the businesses was the relatively poor level of journey time reliability along the A96 resulting in reduced productivity and impacts on achieving transport connections. The surveys also highlighted concerns over driver stress resulting from a lack of overtaking opportunities.

The remoteness of the region relative to other parts of Scotland could also be viewed as a challenge in relation to future growth of the economy, but equally it presents opportunities for enhanced future growth resulting from improved infrastructure provision.

Analysis of travel patterns, using Roadside Interview (RSI) survey information⁷, indicates that the majority of road based trips travel between settlements within the corridor, with as little as twelve per cent of those surveyed, starting and finishing their journeys outwith the Inverness to Aberdeen corridor. **Figure 2-4** shows the distribution of trips of the remaining 88% that have at least an origin or destination in the corridor or the cities at either end.

⁷ A number of Roadside Interviews were undertaken on the A96 in April 2013.

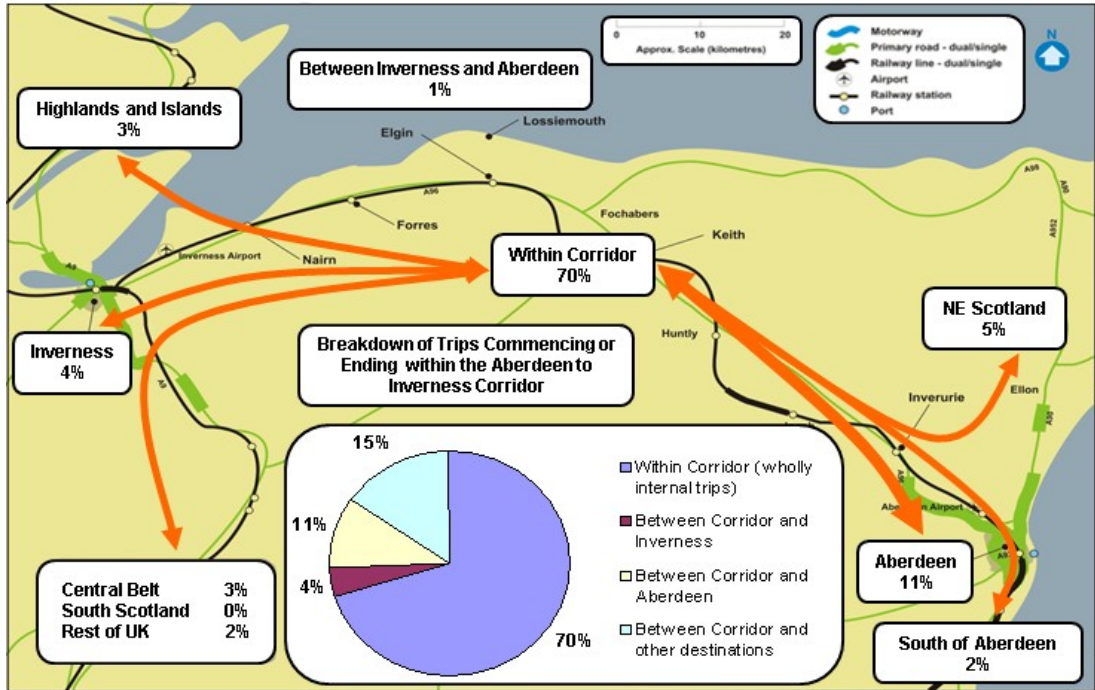


Figure 2-4: Origins and Destinations of Trips on the A96

Demand for Travel: There is heavy reliance on the use of the private car, reflected by the fact that car ownership is generally higher in the towns along the corridor than in Scotland as a whole. The level of car ownership in Aberdeen, Huntly and Inverness is broadly in line with the Scottish average; however other towns on the A96 are noticeably higher. In contrast, overall less than ten per cent of those in employment along the corridor use public transport to commute to work, with the exception of Aberdeen which was found to have a similar proportion of people travelling to work by public transport as the Scottish average. Census data⁸ was used to establish mode share by residents within towns along the A96. The results are presented in **Figure 2-5** overleaf.

⁸ Scotland's Census 2001, General Register Office Scotland.

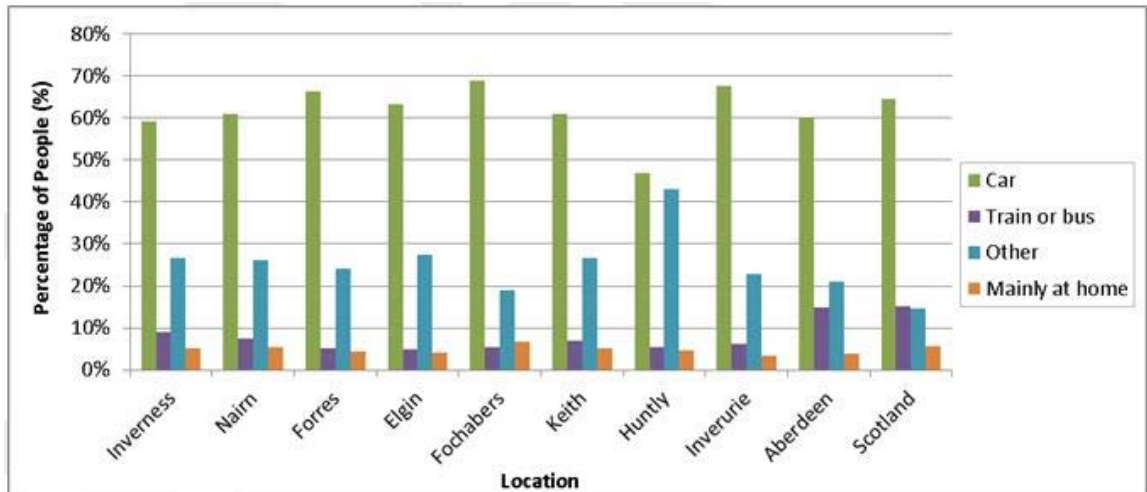


Figure 2-5: Percentage of People Travelling to Work by Mode in Towns along the A96

With a city at either end of the corridor, traffic flows and public transport volumes are at their highest on approach to the cities. In 2012, annual average daily traffic levels were approximately 30,000 on the approaches to the respective cities. However, despite the attractiveness of the cities, a high proportion of car trips start and end their trips ‘within the corridor’, with most car trips on the corridor being less than 25 miles in length.

Information from traffic surveys and TMfS:2012, was used to determine the key destinations along the corridor. Elgin has been identified as a significant attractor/generator of trips, with the highest traffic volumes outwith the approaches to Inverness and Aberdeen. This analysis indicated that up to twice as many trips are made to Elgin, than any of the other towns along the corridor, and daily traffic levels were approximately 18,000 vehicles in 2012. The road traffic levels in 2012 along the key route (A96) within the Inverness to Aberdeen corridor⁹ are presented in **Figure 2-6** overleaf.

⁹ Scottish Road Traffic Database, Transport Scotland.



Figure 2-6: Annual Average Daily Traffic by Section in 2012 (2011*) (2010**) from Scottish Road Traffic Database, Transport Scotland

The percentage of Heavy Goods Vehicles along the route follows a different pattern. Traffic surveys, conducted in 2013, highlighted that the percentage of HGVs varies between just over 6% to almost 12%. There is a noticeable drop in the volume of HGVs east of Fochabers due to a significant proportion travelling on the A98 instead of the A96 east of Fochabers. Roadside Interviews (RSI) undertaken during April 2013 recorded traffic levels by vehicles class during a 12-hour period (07:00 to 19:00).

The travel patterns of public transport use is broadly similar to the private car demand, with the stations nearest the cities (Inverness and Aberdeen) and Dyce having the highest volumes of passengers boarding or alighting along the corridor. Outwith these stations, Elgin has the highest usage of all the towns within the corridor. Train services are irregular, taking approximately two hours 15 minutes to travel the full length of the corridor. There are more frequent commuter services during peak periods. Outwith peak periods, services are less frequent. There is significant planned land-use development along the route which will result in increased demand for travel along the corridor. Road traffic levels are forecast to increase on the route, based on information taken from TMfS:12, by the order of 20-25% between 2012 and 2030.

Connectivity: Travel times along the corridor vary significantly, depending on the mode of travel. The shortest city centre to city centre journey time is achieved by rail travel, with journey times between the two cities, around two hours 15 minutes. This compares to a typical journey time for cars of approximately two hours 40 minutes. Bus journey times are significantly longer with city centre to city centre travel time approximately three hours 50 minutes, equating to an average speed of just over 40km/h. As a result, rail travel is competitive when compared to road based transport for city centre to city centre trips.

The existing journey time between Inverness and Aberdeen is approximately two hours 40 minutes. Using a simple distance, speed relationship, the free flow journey time by road, from Inverness City Centre to Aberdeen City Centre, would be approximately one hour 55 minutes. Although a relatively crude method, the difference between these two journey times (45 minutes) provides an indication of the general delay on the route, through a combination of cumulative junction delay through the towns, the impact of slower moving vehicles, and any constraints caused by road alignment. Bluetooth analysis has been undertaken to assist in identifying what proportion of this 45 minutes is associated with travelling through the towns on the A96. The key findings suggest that traffic travelling through Elgin and Nairn are most likely to experience delays in excess of five minutes, with the spread of journey times generally greater than in the other towns.

Safety: Analysis of the STATS19 data¹⁰ for the period 2008 to 2012, indicated that the sections through the towns of Nairn, Keith and Huntly all had accident rates higher than the corresponding rate for a Built-up Trunk A road¹¹ in Scotland for the same time period. The rural single carriageway sections of the A96 between Fochabers Bypass and Keith, Keith and Huntly, and Huntly and Inverurie also had accident rates higher than the corresponding national rate.

¹⁰ Road accident statistics from personal injury road accidents in Scotland

¹¹ Reported Road Casualties Scotland 2012

A number of sections along the A96 experience severity rates that are higher than the corresponding national rates for that type of road. The sections between Nairn and Forres, between Keith and Huntly, and between Huntly and Inverurie are identified as having fatal accident rates which are higher than the corresponding national rate for a Non Built-up Trunk A road¹¹. In addition, the towns of Nairn, Forres, Keith and Huntly and the sections of A96 between Fochabers and Keith, Keith and Huntly, Huntly and Kintore and Bucksburn and Aberdeen all have higher than national serious accident rates.

Approximately half of all personal injury accidents on the A96, in the five year period, occurred at or near a junction. The route has in excess of 600 junctions along its length; therefore conflict between local and strategic traffic is likely to be a problem on the route. Figure 2-7 contains details on the location of accidents on the route. Over half of all accidents occurred at or near to a junction, which compares with national average for Non Built-up Trunk Roads of less than 30 per cent. It should be noted that the A96 consists of a mixture of Non Built-up and Built-up sections.

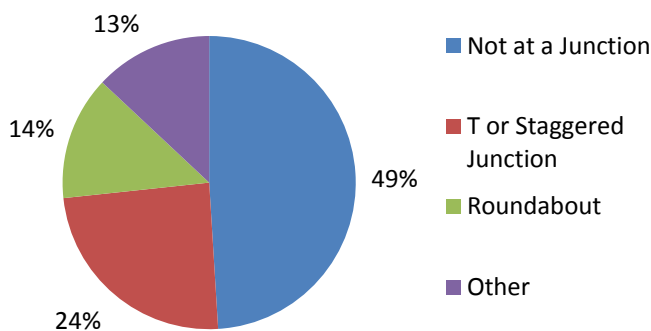


Figure 2-7: Accident Locations on A96 (2008-2012), Relative to Junctions

A number of pedestrian and cyclists have been involved in accidents along the route, with five of the 17 fatal accidents including pedestrians and a further eight serious accidents involving cyclists. Pedestrians were involved in 51 accidents on the route, 39 (76 per cent) of which occurred within a built up area (inclusive of the five accidents which occurred in Fochabers prior to the construction of the bypass). Twelve of the cyclist related accidents also occurred within urban areas.

Improvements to the infrastructure provision could present an opportunity to reduce the conflict between local and strategic trips, particularly with respect to the number of accidents in the towns and involving pedestrians and cyclists.

Summary of Problems and Opportunities

Economy

There has been a reduction in population in Moray in recent years, and there is a view amongst stakeholders and the business community that constraints on the transport network are potentially hindering planned developments. In addition, the business community highlighted problems relating to the existing carriageway provision of the A96 potentially hindering business travel. There are opportunities afforded by nationally important initiatives such as the National Renewables Infrastructure Plan, Enterprise Areas and Proposed National Developments on and adjacent to the Inverness to Aberdeen Corridor. Inverness and Aberdeen rely on immediate neighbours for access to labour, to house essential related economic activities and industries, and the competitive advantage that comes from cities being located near areas of outstanding natural beauty.

Demand for Travel

Only a very small percentage of travel on the corridor is between Inverness and Aberdeen. In addition to the heavy volumes of trips into Inverness and Aberdeen, the number of trips to and from Elgin is significantly higher than to the other towns on the corridor. There is heavy reliance on the use of the private car, reflected by the fact that car ownership is generally higher in the towns along the corridor than in Scotland as a whole. Traffic levels are forecast to increase on the route, by the order of 20-25% between 2012 and 2030.

Connectivity

Inverness to Aberdeen bus journey times (three hours 50 minutes) are not competitive with those for the car (two hours 40 minutes), however rail journey times (two hours 15 minutes) are competitive. Impacting on both bus and car based times is the level of delays experienced in the towns along the route, particularly when travelling through Elgin and Nairn.

Safety

The accidents rates through Nairn, Keith and Huntly are higher than the national rates. In addition, the fatal accident rate on sections of A96 between Fochabers Bypass and Keith, Keith and Huntly, and Huntly and Inverurie are higher than the national rate. On the A96, more than half of all accidents occurred at or near one of the 600+ junctions or accesses along the corridor. Business feedback has highlighted a lack of overtaking opportunities and increased driver stress when travelling on the A96, in addition to issues relating to journey time reliability along the route. Improvements to infrastructure provision could present the opportunity to reduce conflict between local and strategic trips, particularly with respect to the number of fatal accidents involving pedestrians.

Figure 2-8 overleaf summarises the key problems and opportunities on the corridor.

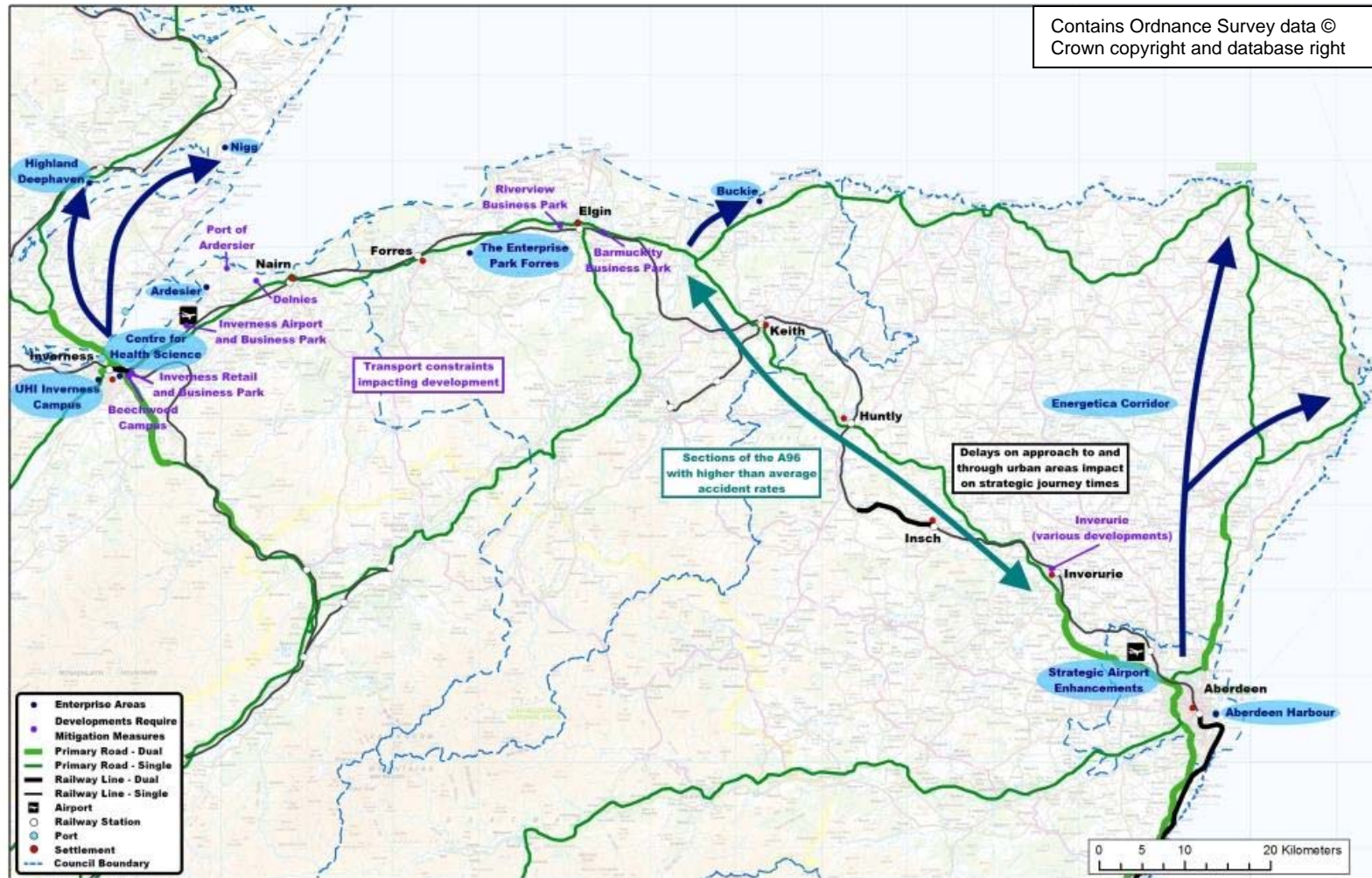


Figure 2-8: Summary of Key Problems and Opportunities

2.4 Transport Planning Objectives

2.4.1 Definition of Objectives

In line with STAG, the transport planning objectives express the outcomes sought for the study area. These have been developed taking cognisance of relevant government policies and plans, and the problems and opportunities identified on the corridor. Underpinned by the National Transport Strategy's Key Strategic Outcomes, the following transport planning objectives were developed.

Objective 1 - To improve the operation of the corridor and inter-urban connectivity between the cities of Aberdeen and Inverness and their city regions through:

- reduced journey times;
- improved journey time reliability; and
- reduced conflicts between local and strategic road based journeys.

This objective reflects the Scottish Government's desire through Scotland's Cities to have well connected cities, to enable the cities to act as drivers of growth in the economy. It also contributes to connecting the strategic economic opportunities outlined in the National Planning Framework 3 and other documents. The objective also addresses a number of problems and opportunities relating to journey time and reliability identified through the review and expressed by stakeholders and the business community. The conflict between local and strategic journeys element addresses the specific issues associated with travel on the A96.

Objective 2 - To improve safety for motorised and non-motorised users through:

- reduced accident rates and severity; and
- reduced driver stress.

Analysis of accident data indicated that although the number of accidents on the corridor has reduced in recent years, there are sections along the A96 where accident rates and fatal accident rates, in particular, are at or above the corresponding national rates for the road types. In addition, a number of pedestrians and cyclists have been involved in accidents along the route, with five of the 17 fatal accidents involving pedestrians, while cyclists were involved in eight of the serious accidents on the A96. Surveys of the businesses and organisations within the corridor also highlighted a lack of overtaking opportunities and increased driver stress when travelling on the A96.

Objective 3 - To provide opportunities to grow the regional economies on the corridor through:

- improved access to the wider strategic transport network; and
- enhanced access to jobs and services.

This objective is aligned to the strategic economic opportunities within the corridor resulting from improved access. It also reflects the reference in Scotland's Cities that

cities rely on their immediate neighbours for access to labour and to house essential related economic activities and industries; and they rely on their rural neighbours for essential products and the competitive advantage that comes from cities being located near areas of outstanding natural beauty.

3.1 Introduction

Potential solutions for the corridor have been identified through the option identification, sifting and development process. For this particular study, information from previous studies undertaken provided a substantial database of potential measures. This information has been reviewed and additional options identified taking cognisance of changes in the corridor in the last few years. Discussions were also held with relevant stakeholders as part of the exercise to derive a list of options.

This chapter outlines the approach to determine potential options, and presents the schemes within the do-minimum scenario, before presenting details of the initial sifting exercise. Finally, the packages of measures that were taken forward to the appraisal process are summarised.

3.2 Future Transport Infrastructure Assumptions

The do-minimum is defined as the most likely transport situation over the course of the appraisal period if no intervention were to occur. Options generated must be appraised against a 'do-minimum' scenario that includes committed transport improvements that have policy funding and approval, and from which it would be difficult to withdraw.

There are a number of committed transport infrastructure improvements between Inverness and Aberdeen, that for the purposes of the appraisal, are assumed will be in place by 2027:

- Aberdeen Western Peripheral Route (AWPR) including a new junction on the A96 near Dyce;
- Aberdeen to Inverness Rail Improvements Phase 1. This scheme aims to deliver a 2 hour journey time between the cities, an hourly service and enhanced commuter services into each city. It will also facilitate the construction of new stations at Kintore and Dalcross by 2019;
- Dalcross will also be a Park-&-Ride site with interchange facilities with Inverness Airport;
- A96 Inverness to Nairn (including Nairn Bypass) – upgrading of the A96 to dual carriageway between the roundabout at Inverness Retail and Business Park and Nairn, including a Nairn Bypass;
- A96 Inveramsay Bridge – Construction of a realigned carriageway to allow for the removal of traffic lights at the Inveramsay Rail Bridge;
- A96 Threapland Junction – Upgrading the junction at Threapland on the A96 approximately 1 kilometre east of Lhanbryde to improve safety;
- A9/A96 Connections – Link road between A9 at Inshes and A96 at Smithton;
- Strategic Park and Ride at Dyce on the A96; and
- A90/A96 Haudagain Roundabout upgrade.

Land use data is collected from Local and Strategic Planning Authorities bi-annually for use in the Transport, Economic and Land-use Model for Scotland. This includes the Planning Authority's land use allocations, permissions, completions, demolitions and re-development and concerns a period extending to the short-term (5 years), medium-

term (10 years) and long-term (20 years and beyond). This Planning Authority data is then processed and forms the do-minimum development profile scenario for the study.

3.3 Option Generation, Sifting and Development

The generation of options resulted in a long list of potential interventions identified through previous studies, Regional and Local Transport Strategies, Development Plans, the Study Team and consultation with Local Authorities, Regional Transport Partnerships and various teams within Transport Scotland. These options were then sifted and those which remained were further developed into study options.

3.4 Study Options identified for Detailed Appraisal

The study options were subject to initial appraisal against the transport planning objectives outlined in section 2.4.1 and the standard appraisal criteria outlined in the Scottish Transport Appraisal Guidance, established policy directives and feasibility, affordability and likely public acceptability. Following the sifting process six options were taken forward for detailed appraisal:

- Rail enhancements / rolling stock Improvements to provide an end-to-end travel time of around 1hr 45mins;
- Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities outside of peak periods;
- Targeted trunk road improvements;
- Targeted trunk road improvements and new (single carriageway) bypasses on the A96;
- Dual carriageway bypasses and dualling of heavily trafficked sections of the A96 plus targeted trunk road improvements; and
- A96 Full Dualling plus targeted Trunk Road Improvements.

Table 3-1 overleaf outlines the option description and associated appraisal assumptions.

Option	Option Title	Description	Assumptions (modelling/appraisal purposes)
	Do-Minimum	Aberdeen Western Peripheral Route (AWPR); Aberdeen to Inverness Rail Improvements; A96 Inverness to Nairn (including Nairn Bypass); A96 Inveramsay Bridge; A96 Threapland Junction; and Connection between the A9 and A96 to the East of Inverness.	Road schemes coded based on information provided by project teams; Rail Improvements, new stations at Dalcross and Kintore; Maintain freight routes; and Increased commuter frequency at east end. For modelling purposes rail improvements are: <ul style="list-style-type: none"> - 30 mins frequency peak Inverurie to Aberdeen; - 1 hr frequency remainder of the day; and - 2 hour end to end journey time.
1	Rail Enhancements / Rolling Stock Improvements to Provide an End-To-End Travel Time of Around 1hr 45mins	Improved infrastructure to accommodate either electrified or high powered diesel rolling stock along the rail network.	This option is based on the assumption that an average line speed of 60mph could be achieved along the route. Until further detailed assessment has been undertaken it will not be possible to determine what works would be required to deliver this option. The following potential infrastructure and rolling stock improvements may deliver these improvements and are assumed for assessment purposes only at this stage. Electrification of railway route involving overhead line gantries and conductors and associated electrical lineside control equipment. High powered diesel or electric rolling stock capable of faster acceleration from stations to reduce journey times. Possible localised works to rails/formation to increase radii of curves or additional loops (mostly within existing rail corridor). For transport modelling and appraisal purposes: <ul style="list-style-type: none"> - 1hr 45 mins journey time, frequencies no worse than do-min

Option	Option Title	Description	Assumptions (modelling/appraisal purposes)
2.	Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities outside of peak	<p>Rail service enhancements to allow a 15 minute frequency between Inverurie and Aberdeen and Nairn and Inverness during peak periods.</p> <p>The remaining settlements which are within one hour of Aberdeen and Inverness will receive a 30 minute frequency, which forms part of the hourly service between both cities.</p>	<p>Assumptions:</p> <ul style="list-style-type: none"> - Track and signalling enhancements have been delivered through the Aberdeen to Inverness rail improvements project; - The route has been electrified; - 15 minute frequency of rail passenger services during the peak periods between Inverness and Nairn, and, Inverurie and Aberdeen (including stops at Dalcross and Kintore); - 30 minute service between Aberdeen and Huntly and Inverness and Elgin calling at all stations; and - Hourly service between Inverness and Aberdeen which does not call at all intermittent stations during peaks to make way for stops at Dalcross and Kintore.
3	Targeted Trunk Road Improvements	Physical works to improve safety and operational efficiency of the A96, such as: WS2+1 sections; climbing lanes; hard strip provision; local realignments and junction improvements.	<p>Assume generally where possible to complete on-line and where land allows for junction improvements.</p> <p>Works targeted on sections where safety and operation are issues.</p> <p>Assume avoidance of most severe effects on constraints, designations and communities.</p>
4	Targeted Trunk Road Improvements and New (Single Carriageway) Bypasses on A96	Single carriageway bypasses of Forres, Elgin and Keith. Targeted Trunk Road Improvements (Option 3) for the remaining sections of the A96.	<p>Assumes that all three bypasses are constructed.</p> <p>Assume avoidance of most severe effects on constraints, designations and communities.</p> <p>On remainder of the route as Option 3.</p>

Option	Option Title	Description	Assumptions (modelling/appraisal purposes)
5	Dual Carriageway Bypasses and Dualling of Heavily Trafficked Sections of the A96 plus Targeted Trunk Road Improvements	Dual carriageway bypasses of Forres, Elgin and Inverurie and dualling of heavily trafficked sections of the A96. Single carriageway bypass of Keith. Targeted Trunk Road Improvements (Option 3) for the remaining sections of the A96.	<p>Dual carriageway on the most heavily trafficked sections.</p> <p>Dual carriageway bypasses around Forres, Elgin and Inverurie (assume avoidance of most severe effects on constraints, designations and communities). Single carriageway bypass of Keith.</p> <p>On remainder of the route as Option 3.</p>
6	A96 Full Dualling plus targeted Trunk Road Improvements	Provide dual carriageway between Inverness and Aberdeen.	<p>A combination of on-line and off-line works allowing for avoidance of most severe effects on constraints, designations and communities.</p> <p>Grade separated junctions, at least one per major settlement.</p> <p>Dual carriageway bypasses around Forres, Elgin, Keith, Huntly, Inverurie.</p>

Table 3-1: Options Appraised

4.1 Introduction

Each of the six options has been appraised in accordance with STAG, with the appraisal criteria consisting of:

- transport planning objectives;
- implementability appraisal (feasibility, affordability and public acceptability);
- STAG Criteria
 - environment;
 - safety;
 - economy;
 - integration; and
 - accessibility and social inclusion.

A proportionate approach to the appraisal was carried out recognising that at this stage of the option development, the level of detail of some aspects of the options was limited.

Transport Model for Scotland (2012) (TMfS:12) and TELMOS provided the majority of the quantification required to appraise all options, with the exception of Option 3 Targeted trunk road Improvement, as the national model is a strategic model and therefore does not have the functionality to determine the impact of a route management option such as this in a robust manner. It should be noted that the areas quoted in the paragraphs below in relation to population and employment impacts are based on modelled zones and therefore do not correspond directly to the local authority boundaries. Nonetheless this provides a useful indication of the geographic distribution of the impacts of the options. The principal assessment years are taken as 2032 and 2037, as these represent the standard modelled years within TMfS after the assumed implementation dates.

4.2 Summary of Option Appraisal

The performance of the six options against the appraisal criteria is set out below, noting that at this stage of the appraisal process it is considered that there are no fundamental implementability issues that would result in any of the options being undeliverable. **Table 4-1** presents details of changes in demand on key sections of the route for each mode and **Table 4-2** summarises the economic performance of each option. The outcome of the appraisal is summarised in the Option Summary Table (OST) contained in Appendix A.

4.2.1 Option 1: Rail Enhancement/Rolling Stock Improvements to provide an end-to-end travel time of around 1hr 45 mins

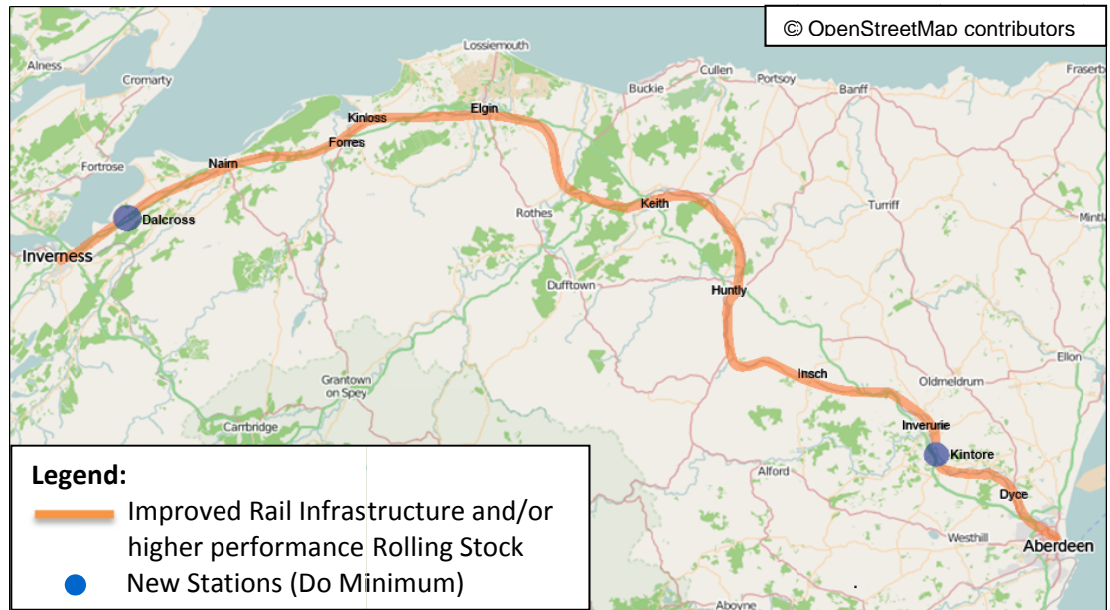


Figure 4-1: Option 1: Rail Enhancements / Rolling Stock Improvements to Provide an End-To-End Travel Time of Around 1hr 45mins

Although this option would contribute towards the transport planning objectives of reducing journey times by reducing end-to-end times by 15 minutes, it is forecast to result in very little change to travel patterns along the corridor. Rail patronage levels are forecast to increase by only a few percent, with a corresponding decrease in bus patronage levels. As a result, the volume of trips by private car is likely to experience a marginal reduction compared to the do-minimum scenario.

With regard to the transport planning objective of growing the regional economy, this option is forecast to result in a small number of additional jobs and a minor increase in population levels in the north and north-east of Scotland.

Overall, this option would have a moderately positive impact on three out of the seven transport planning sub-objectives; those that are related to improving journey time and access to the wider strategic transport network. The option would have a limited impact on the STAG criteria due to the minimal change in travel patterns on the corridor.

Option 1 has a marginally positive benefit-to-cost ratio (BCR) including wider economic benefits and driver frustration (BCR). However, it should be noted that, as the operating and rolling stock costs could be incorporated within a future franchising agreement, no allowance for these costs have been made at this stage of the appraisal process. If these costs were included it would reduce the BCR for this option. Should this option be taken forward a more detailed assessment of the operating costs would need to be undertaken to determine the appropriate level of costs to assign to this particular option.

4.2.2 Option 2: Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities outside of peak

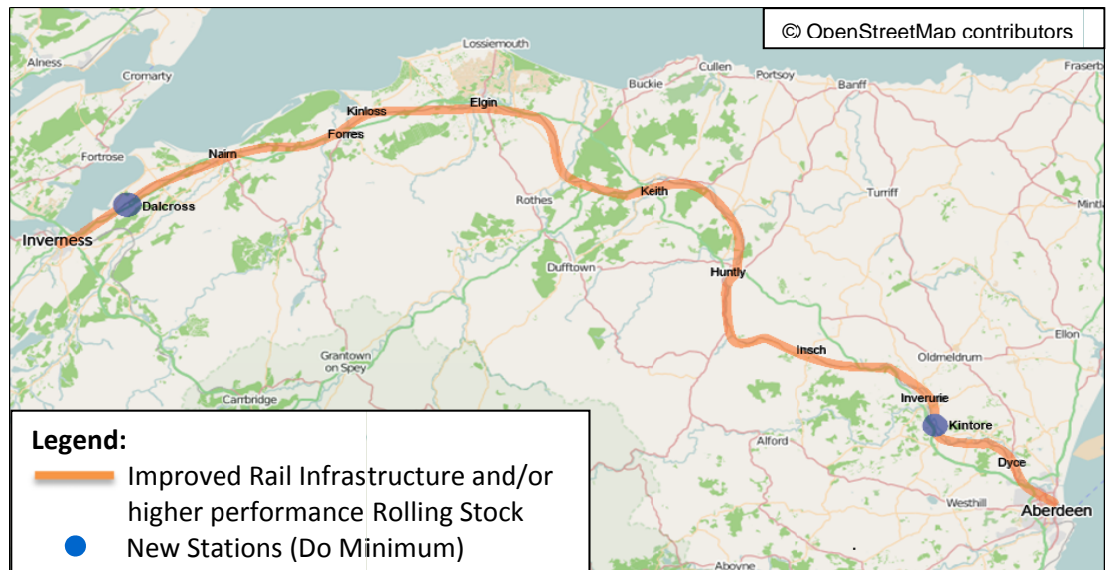


Figure 4-2: Option 2: Rail service enhancements to allow a 15 minute frequency into both cities during the peak periods with a 30 minute frequency for services into both cities outside of peak

This option would contribute towards the transport planning objectives of reducing overall journey times between towns due to the increased frequency (i.e. resulting in reduced wait times). This significant improvement in the frequency would be forecast to result in an additional shift of trips from bus to rail. Rail patronage levels are forecast to increase by up to 30% at the west end of the corridor, with the increase at the east being approximately 15%. However, as with Option 1 there would be negligible reduction in car volumes along the corridor.

The improved levels of accessibility to the two cities is forecast to result in approximately 3,000 additional new jobs by 2037, with the majority of these being in the Aberdeen area, thereby contributing to the objective of growing the regional economy. Net population increases under this option are also forecast to be less than 1%, with the Moray area accounting for the majority of this change. This combined pattern would result in an increase in the number of people commuting from the Moray area on the corridor to Aberdeen.

Overall, this option would have a moderately positive impact on four out of the seven transport planning sub-objectives; those that are related to improving journey time and access to the wider strategic transport network, and jobs and services. The option would perform slightly better than Option 1 in relation to the STAG criteria.

This option has an indicative BCR of 1.0-1.25. However it should be noted, that as the operating and rolling stock costs could be incorporated within a future franchising agreement, no allowance for these costs have been made at this stage of the appraisal process. Should this option be taken forward a more detailed assessment of the operating costs would need to be undertaken to determine the appropriate level to assign to this particular option.

4.2.3 Option 3: Targeted trunk road improvements

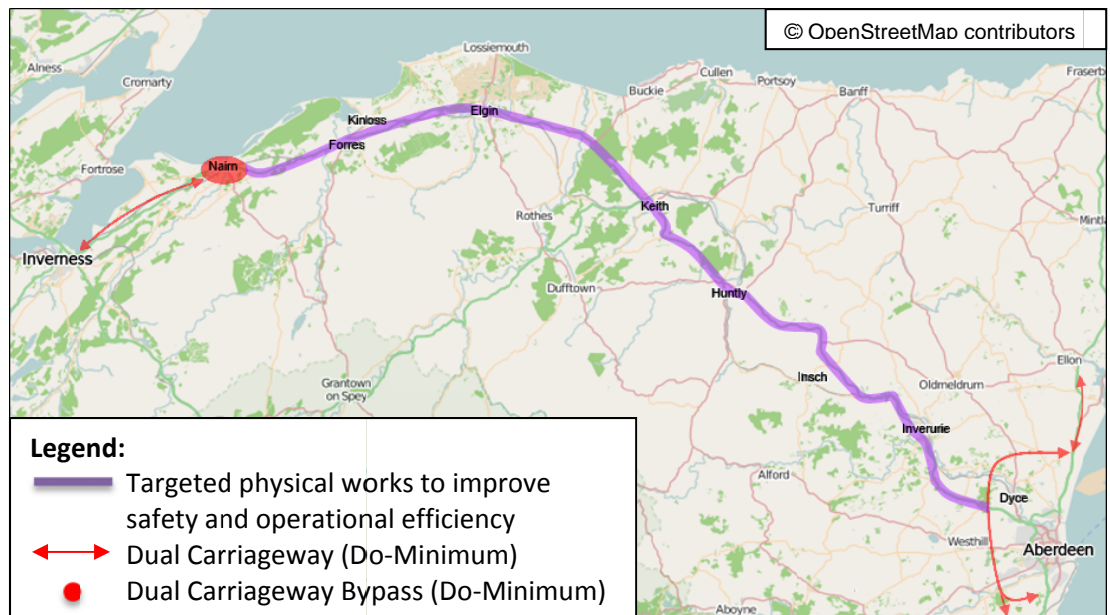


Figure 4-3: Option 3: Targeted trunk road improvements

Option 3 is unlikely to result in any discernible change in mode choice or traffic flow levels. There could be a reduction in accident levels but this is unlikely to result in a change of severity ratios. There will be no noticeable impact on driver stress as any improvements due to increased overtaking opportunities could be offset by the potential increased stress of varying road cross sections along the corridor.

It is unlikely to have any material impact on connectivity to or within the corridor and no significant impact on access to jobs or services. Therefore, there would be no resulting changes in population or employment levels in the region.

Given the above, this option does little to contribute towards any of the transport planning objectives, and has limited impact on the STAG criteria.

As this option was not coded in the TMfS, the BCR was determined by considering the potential beneficial impacts on road safety alone. This results in a BCR of approximately 0-0.5.

4.2.4 Option 4: Targeted trunk road improvements and new (single carriageway) bypasses on A96

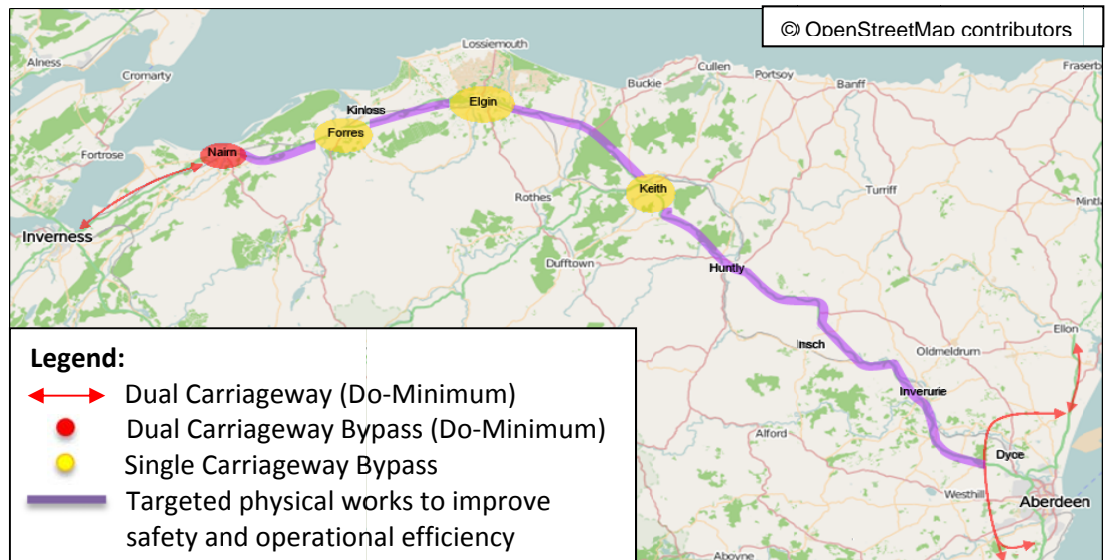


Figure 4-4: Option 4: Targeted trunk road improvements and new (single carriageway) bypasses on A96

Contributing towards the journey time objective, under Option 4, the end-to-end journey times on the A96 are forecast to reduce by six minutes in the am peak, compared to the do-minimum time of approximately two hours 30 minutes. This option would also result in a reduced volume of traffic travelling through the towns that are being bypassed thereby improving journey time reliability, the urban environment in these areas, reducing severance and contributing to an increased quality of place. However, the overall volumes of car trips on the corridor are unlikely to increase significantly. There is also unlikely to be any change in the levels of rail patronage along the corridor.

Addressing the second objective, the number of accidents is forecast to reduce by up to 10% in 2037, due to the upgrade and construction of town bypasses, but this is unlikely to result in a significant change in the severity ratio. There may be some perceived benefits associated with reduced driver stress as a result of having to drive through fewer towns, although the changing cross sections could be perceived as increasing the stress of driving the route.

This option is unlikely to have a significant impact on connectivity of the corridor to the rest of Scotland, but it is forecast to result in increased levels of employment and population within the corridor, thereby contributing to the objective of growing the regional economy. The Moray area accounts for an increase in over 900 jobs (approximately 3%) and a slight population increase (less than 1%), with other areas experiencing no change or a slight decrease.

Overall, Option 4 has limited impact on the transport planning objectives and STAG criteria when compared to Options 5 and 6.

In value for money terms, with a BCR of 0.75-1.0 this option shows a lower return than Option 5 and Option 6. It should be noted that this option provides far lower degree of benefits associated with wider economic impacts or additional jobs or

increases levels of population. It also provides none of the potential driver stress related benefits associated with Options 5 and 6.

4.2.5 Option 5 - Dual carriageway bypasses and dualling of heavily trafficked sections of the A96 plus targeted trunk road improvements



Figure 4-5: Option 5: Bypasses and dualling of heavily trafficked sections plus targeted trunk road improvements

Contributing significantly towards the objective of saving journey time and improving reliability, Option 5 is forecast to result in a reduction in end-to-end journey times of approximately 25 minutes on the A96, from approximately two hours 30 minutes, which would result in an increase in vehicle trips along the route. The largest change is likely to be on the sections between Nairn and Elgin, of up to 8,000 vehicles AADT. This is a result of re-routing from other routes, such as the A9, A95, A939 and the A940, as some of these would be less desirable than an upgraded A96. There would also be some redistribution of trip destinations resulting from increased accessibility to the towns for employment. This option is forecast to result in a transfer of public transport trips from rail to bus, particularly at the west end of the corridor. However, it should be noted that the magnitude of this change is not significant in terms of the total trips on the corridor.

Addressing the second objective, it is forecast that there will be 20-30% reduction in accident levels. Driver frustration benefits are anticipated as a result of dualling approximately 50% of the route.

Connectivity improvements within the corridor and the north and northeast of Scotland are likely to be achieved as well as an increase in accessibility to jobs and services. Just over 3,000 new jobs are forecast to be generated and an increase in population of approximately 1,000 in 2037. The Moray area is forecast to generate approximately 3,000 jobs (10% increase), thereby contributing to the objective of growing the regional economy, with a small increase in the Aberdeen area and small decreases elsewhere in the region. The population in Moray is forecast to increase

by approximately 1,500 by 2037 (1%), with a decrease of approximately 700 in Aberdeen and small changes elsewhere.

Given the significant level of improvement in carriageway provision and the construction of bypasses, this option contributes well towards all the transport planning objectives and has a largely positive impact against all the STAG criteria apart from the environment, due to the potential impact on CO₂, landscape, cultural heritage and visual amenity. The scale of this impact would not be known until further information on a particular alignment is determined.

With a BCR of 1.25-1.5, this option is forecast to deliver the greatest value for money of all options. In addition, by dualling approximately 50% of the route, which are the most heavily trafficked sections, it provides significant wider economic and driver frustration benefits. It does not, however, entirely achieve the ambitions set out by the Scottish Ministers of connecting Scottish Cities by dual carriageway.

4.2.6 Option 6 - A96 Full dualling plus targeted trunk road improvements



Figure 4-6: Option 6: Full dualling plus targeted trunk road improvements

Option 6 is forecast to produce a similar impact on the east end of the route as Option 5. However with the dualling of the full route, the overall end-to-end journey time is forecast to reduce by approximately 35 minutes, compared to 25 minutes under Option 5. As a result this option would provide the greatest contribution towards the journey time objective. As a result of the improvements, between Huntly and Inverurie the traffic volumes are forecast to increase by approximately 4,000 vehicles at the AADT level, compared to 1,000 vehicles under Option 5. These increases in flows are largely as a result of re-routing from the A9, A947 and the A920. There would also be a noticeable change in public transport trips on the whole route with a switch from rail to bus.

This option would also provide the greatest contribution towards the second objective, as it is forecast that there would be a 30-40% reduction in accident numbers. Significant driver frustration benefits are anticipated as a result of the dualling of the whole route.

Connectivity improvements within the corridor and the north and east of Scotland to Tayside are likely to be achieved as well as an increase in accessibility to jobs and services. Approximately 4,500 new jobs are forecast to be generated and an increase in population of approximately 1,400 in 2037. The Moray area is forecast to generate approximately 3,000 jobs (10% increase), thereby contributing to the objective of growing the regional economy, with approximately 1,500 (less than 1%) in the Aberdeen area and minor impacts elsewhere in the north and north-east of Scotland. The population in the Moray area is forecast to increase by approximately 2,300 (2%), with a decrease of approximately 900 in Aberdeen and small changes elsewhere.

Overall, this option would deliver the greatest level of improvement on the corridor and results in greater contributions towards the transport planning objectives than any of the other options. It would also have a largely positive impact against all the

STAG criteria apart from the environment due to the potential impact on CO₂, landscape, cultural heritage and visual amenity. The scale of this impact would not be known until further information on a particular alignment is determined.

With a BCR of 1.0-1.25, in value for money terms, it shows a similar return to Option 2 and 4, but as a result of dualling the entire route it provides the highest Present Value of Benefit (PVB), the highest levels of wider economic and driver frustration benefits, and positive impacts on population and employment in the corridor. This option also achieves the ambitions set out by the Scottish Ministers of connecting Scottish Cities by dual carriageway.

Section	Travel Mode	Do Min	Option 1	Option 2	Option 4	Option 5	Option 6
Nairn to Forres	Road	15,000	15,000	15,000	15,500	18,400	18,600
	Rail	1,910	1,940	2,150	1,890	1,580	1,530
	Bus	300	300	200	300	600	600
Forres to Elgin	Road	16,600	16,600	16,600	18,000	24,400	24,700
	Rail	2,190	2,200	2,470	2,130	1,620	1,560
	Bus	900	900	700	900	1,400	1,400
Elgin	Road	25,700	25,700	25,700	17,800	18,200	18,700
	Rail	N/A	N/A	N/A	N/A	N/A	N/A
	Bus	2,000	1,900	1,900	2,000	2,300	2,300
Elgin Bypass	Road	0	0	0	11,200	13,900	14,300
	Rail	N/A	N/A	N/A	N/A	N/A	N/A
	Bus	0	0	0	0	0	0
Elgin to Fochabers/A98	Road	18,800	18,800	18,800	19,700	20,900	23,000
	Rail	1,650	1,700	1,560	1,600	1,440	1,240
	Bus	1,300	1,200	1,300	1,300	1,400	1,500
Fochabers/A98 to Keith	Road	9,400	9,400	9,400	9,900	10,100	13,000
	Rail	N/A	N/A	N/A	N/A	N/A	N/A
	Bus	1,300	1,300	1,300	1,300	1,300	1,500
Keith	Road	9,900	9,800	9,800	1,600	1,600	2,200
	Rail	N/A	N/A	N/A	N/A	N/A	N/A
	Bus	300	300	300	300	400	600
Keith Bypass	Road	0	0	0	9,100	8,900	11,700
	Rail	N/A	N/A	N/A	N/A	N/A	N/A
	Bus	0	0	0	0	0	0
Keith to Huntly	Road	9,900	9,800	9,800	10,700	10,500	13,900
	Rail	1,770	1,820	1,860	1,720	1,590	1,360
	Bus	300	300	300	300	400	600
Huntly to Inverurie	Road	12,800	12,700	12,700	13,000	13,900	16,900
	Rail	2,825	2,880	3,160	2,780	2,650	2,330
	Bus	400	400	300	400	400	700
Inverurie to Bucksburn	Road	30,300	30,300	30,300	30,500	31,500	32,500
	Rail	2,650	2,700	3,130	2,610	2,540	2,340
	Bus	2,000	2,000	1,700	300	300	400

Table 4-1: Summary of Demand at Key Sections (Passengers/vehicles in 2037)

Note: Bus and rail relate to passengers, road relates to vehicles

Source: Transport Model for Scotland (2012)

	Present Value of Benefits (PVB) £,000s	Present Value of Costs (PVC) £,000s	BCR	BCR (WEBS)	BCR (DF and WEBS)
Option 1	10-15,000	100-125,000	0-0.5	0-0.5	0-0.5
Option 2	75-100,000	125-150,000	0.5-0.75	1.0-1.25	1.0-1.25
Option 3	50-75,000	150-175,000	0-0.5	0-0.5	0-0.5
Option 4	150-175,000	200-225,000	0.5-0.75	0.75-1.0	0.75-1.0
Option 5	800-850,000	800-850,000	1.0-1.25	1.25-1.5	1.25-1.5
Option 6	1,100-1,200,000	1,400-1,500,000	0.75-1.0	1.0-1.25	1.0-1.25

Table 4-2: Inverness to Aberdeen Corridor: Economic Appraisal Results

Notes: Costs and Benefits are indicative (£000s) and are discounted to 2010 at 2010 prices.

PVB values take account of travel time, vehicle operating costs, global air quality and accidents, but do not take account of delays during construction or maintenance.

Under options 1 and 2, no costs for new rolling stock or additional rail operating and maintenance costs have been included.

BCR (WEBS) includes benefits associated with the Wider Economic Benefits.

BCR (WEBS) does not take account of any economic welfare benefits associated with improved labour supply (WB4).

BCR (DF and WEBS) includes benefits associated with the Wider Economic Benefits and the reduction in levels of driver frustration.

The outcome of this appraisal clearly demonstrates that the proposal to dual the A96 is the best way to meet the future needs of those living, working and travelling along the A96 Corridor in the 21st Century. Importantly, the appraisal has shown that, the dualling is best able to meet the Transport Planning Objectives, by providing drivers with a consistent road standard that provides the best connectivity for those using the route, either end to end or to the many destinations along the corridor. Dualling the A96 will also complement the planned upgrades to the A9 and A90 Aberdeen Western Peripheral Route (AWPR), and will provide those people and businesses located along the corridor with the best possible access to Inverness and Aberdeen and onwards to Central Belt.

The appraisal demonstrates that Option 6, full dualling of the A96, would deliver significant wider economic and accessibility benefits. While the alternative Option 5 does offer slightly better value for money, it does not provide the consistency of carriageway standard and therefore does not deliver the best solution to meet the future needs of the corridor. Dualling the entire route provides the highest Present Value of Benefit (PVB) and the highest levels of wider economic and driver frustration benefits.

In summary:

- transport planning objectives the appraisal evidence demonstrates that the options for further improving the transport links between Inverness and Aberdeen over and above existing commitments should be road based infrastructure interventions;
- full dualling of the A96 between Inverness and Aberdeen is the best performing option in terms of the transport planning objectives and the STAG criteria; and
- more detailed work on the Outline Business Case will help to refine the phasing and programme.

Appendix A – Option Summary Table

Option Appraisal – Summary Table

Criteria		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
		Rail Enhancements / Rolling Stock Improvements to Provide an End-To-End Travel Time of around 1hr 45mins	Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities	Targeted Trunk Road Improvements	Targeted Trunk Road Improvements and New (Single Carriageway) Bypasses on A96	Dual Carriageway Bypasses and Dualling of Heavily Trafficked Sections of the A96 plus Targeted Trunk Road Improvements	A96 Full Dualling plus Targeted Trunk Road Improvements
		Improved infrastructure to accommodate either electrified or high powered diesel rolling stock along the rail network.	Rail service enhancements to allow a 15 minute frequency between Inverurie and Aberdeen, and Nairn and Inverness during peak periods. The remaining settlements which are within one hour of Aberdeen and Inverness will receive a 30 minute frequency, which forms part of the hourly service between both cities	Physical works to improve safety and operational efficiency of the A96, such as: WS2+1 sections; climbing lanes; hard strip provision; local realignments and junction improvements.	Single carriageway bypasses of Forres, Elgin and Keith. Targeted Trunk Road Improvements (Option 3) for the remaining sections of the A96.	Dual carriageway bypasses of Forres, Elgin and Inverurie and dualling of heavily trafficked sections of the A96. Single carriageway bypass of Keith. Targeted Trunk Road Improvements (Option 3) for the remaining sections of the A96.	Provide dual carriageway between east of Nairn and Aberdeen (i.e. Inverness to Nairn including Nairn Bypass in the do-minimum).
To improve the operation of the corridor and inter-urban connectivity between the cities of Inverness and Aberdeen and their city regions through ...	Objective 1.1 ... reduced travel times.	Moderate Positive – 15 minute reduction in end to end journey times.	Moderate Positive – Significant improvement in service frequencies resulting in a reduction in wait times of up to approximately 15 minutes for those using the rail services.	Minor Positive – Fewer geometric constraints and more overtaking opportunities. Only slight reduction in journey likely.	Minor Positive – Fewer geometric constraints, and more overtaking opportunities. Fewer delays in towns, reduced journey times up to 6 minutes in AM peak.	Moderate Positive – Higher speed limits and opportunities to overtake on some sections, fewer delays in towns, reduced journey times up to 25 minutes in AM peak.	Major Positive – Higher speed limits and opportunities to overtake along full route, no delays in towns, reduced travel times up to 35 minutes in AM peak.
	Objective 1.2 ... improved travel time reliability.	Moderate Positive –New rolling stock or electrification would result in improved journey time reliability.	Moderate Positive - New rolling stock or electrification would result in improved journey time reliability.	Neutral/Minor Positive – Increased overtaking opportunities at some locations but no major benefits overall.	Minor Positive –Increased overtaking opportunities and fewer delays in towns that are bypassed.	Moderate Positive – Increased overtaking opportunities and fewer delays in towns that are bypassed, major benefits over 50% of the route.	Major Positive – Dualling of full route will result in no delays due to platooning of vehicles, no delays in towns, and the most reliable journey time.
	Objective 1.3 ... reduced conflict between local and strategic journeys.	Neutral – No reduction in traffic flows on the corridor and increase in rail demand of less than 5%.	Neutral - No reduction in traffic flows on the corridor. Increase in rail demand of up to 30% resulting in reduction in number of bus passengers but unlikely to result in any meaningful reduction in volume of buses.	Neutral – No change in travel patterns and therefore no impact.	Minor Positive – Removal of through traffic in towns results in a reduction in traffic on the existing A96 of: 30-40% in Elgin and over 70% in Keith. Approximately 20-30% reduction in the numbers of junctions/accesses. Bypassed towns benefit somewhat from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.	Moderate Positive – Removal of through traffic in towns results in a reduction in traffic on the existing A96 of: 25-30% in Elgin and over 75% in Keith. Some dis-benefit for local trips due to limited access to dual carriageway. Approximately 30-40% reduction in the number of junctions/accesses. Bypassed towns benefit somewhat from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.	Major Positive – Removal of through traffic in towns results in a reduction in traffic on the existing A96 of: 25-30% in Elgin and over 75% in Keith. Some dis-benefit for local trips due to limited access to dual carriageway. Over 70% reduction in no. of junctions/accesses. Bypassed towns benefit from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.

Criteria		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
		Rail Enhancements / Rolling Stock Improvements to Provide an End-To-End Travel Time of around 1hr 45mins	Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities	Targeted Trunk Road Improvements	Targeted Trunk Road Improvements and New (Single Carriageway) Bypasses on A96	Dual Carriageway Bypasses and Dualling of Heavily Trafficked Sections of the A96 plus Targeted Trunk Road Improvements	A96 Full Dualling plus Targeted Trunk Road Improvements
STAG Environment & SEA		<p>Local: Minor Positive to Minor Negative Regional: Minor Positive to Minor Negative</p> <p>Generally neutral effects on global emissions. Neutral effect on Water and Soils & Geology. Minor positive effect on Population & Human Health. Potential for minor negative effect on Biodiversity, Historic Environment and Landscape</p>	<p>Local: Minor Positive to Minor Negative Regional: Minor Positive to Minor Negative</p> <p>Generally neutral effects on global emissions. Neutral effect on Biodiversity, Soils & Geology and Historic Environment. Minor positive effect on Population & Human Health. Potential for minor negative effect on Water and Landscape</p>	<p>Local: Minor Positive to Moderate Negative Regional: Minor Positive to Moderate Negative</p> <p>Generally neutral effects on global emissions. Minor positive effect on Population & Human Health. Potential for minor negative effect on Biodiversity and Soils & Geology. Minor positive to moderate negative effects on Water. Minor to moderate negative effects on Historic Environment and Landscape</p>	<p>Local: Minor/Moderate Positive to Minor/Major Negative Regional: Minor Positive to Minor/Moderate Negative</p> <p>Generally neutral effects on global emissions. New works have potential for minor/moderate negative effect on Population & Human Health, Soils & Geology, Historic Environment and Landscape. Potential for minor positive to moderate negative effect on Biodiversity and Water.</p> <p>Bypassed towns benefit (generally minor/moderate effects) from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.</p>	<p>Local: Moderate/Major Positive to Moderate/Major Negative Regional: Moderate Positive to Minor/Moderate Negative</p> <p>Generally minor negative effects on global emissions. New works have potential for moderate negative effect on Population & Human Health. Potential for minor negative effect on Soils & Geology and Water and minor to moderate negative effect on historic environment and landscape. Minor positive to moderate negative effects on Biodiversity.</p> <p>Bypassed towns benefit (generally moderate effects) from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.</p>	<p>Local: Major Positive to Moderate/ Major Negative Regional: Moderate/Major Positive to Minor/Moderate Negative</p> <p>Generally minor negative effects on global emissions. New works have potential for moderate negative effect on Population & Human Health. Potential for minor negative effect on Soils & Geology and minor to moderate negative effect on historic environment and landscape. Minor positive to moderate/major negative effects on Biodiversity and Water</p> <p>Bypassed towns benefit (generally moderate to major positive effects) from reduced noise, local air quality improvements, reduced visual amenity and cultural heritage impacts.</p>
STAG Safety		Neutral – No reduction in traffic flows on the corridor and therefore no impact on safety.	Neutral - No reduction in traffic flows on the corridor and therefore no impact on safety.	Minor Positive – 0-10% reduction in accident numbers, unlikely to result in a change in severity.	Minor Positive – 0-10% reduction in accident numbers, unlikely to result in a change in severity.	Moderate Positive – overall 20-30% reduction in accident numbers and reduction in severity.	Moderate Positive – 30-40% reduction in accident numbers and reduction in severity.
STAG Economy	Direct	Neutral – Travel times - up to 15 minutes for end to end journeys. Rail demand up by 5% but very little transfer from car.	Minor Positive – reduced wait times resulting from significant increase in frequencies. Rail demand increase by up to 30% but very little transfer from car.	Neutral – Minor reductions in journey times and reduction on accidents.	Minor Positive – Travel times savings - up to 6 minutes for end to end journeys. Up to 10% increase in traffic volumes.	Moderate Positive – Travel times savings– up to 24 minutes for end to end journeys. Up to 45% increase in traffic volumes.	Moderate Positive – Travel times savings –up to 37 minutes savings for end to end journeys. Up to 50% increase in traffic volumes.
	WEBS	Minor Positive – Minor contribution from agglomeration, economies and increased output.	Minor Positive – Moderate contribution from agglomeration, economies and increased output, particularly in Aberdeen area.	Neutral – All factors negligible.	Minor Positive – Minor contribution from agglomeration, economies and increased output.	Moderate Positive – Moderate contribution from agglomeration, economies and increased output, particularly within the corridor and Inverness area.	Moderate Positive – Moderate contribution from agglomeration, economies and increased output, along the length of the corridor and in the Aberdeen and Inverness area.

Criteria		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
		Rail Enhancements / Rolling Stock Improvements to Provide an End-To-End Travel Time of around 1hr 45mins	Rail service enhancements to allow a 15 minute frequency into both cities during peak periods with a 30 minute frequency for services into both cities	Targeted Trunk Road Improvements	Targeted Trunk Road Improvements and New (Single Carriageway) Bypasses on A96	Dual Carriageway Bypasses and Dualling of Heavily Trafficked Sections of the A96 plus Targeted Trunk Road Improvements	A96 Full Dualling plus Targeted Trunk Road Improvements
	EALI	Minor Positive - Improved access to the cities results in increase of 80 jobs in the corridor by 2037 and 80 increase in population.	Moderate Positive – Improved access to the cities results in increase of 2800 jobs in the corridor by 2037 and 350 increase in population.	Neutral – No material impact.	Minor Positive – Improved access to the cities results in increase of 400 jobs in the corridor by 2037 and 150 increase in population.	Moderate Positive – Improved access to the cities results in increase of 3100 jobs in the corridor by 2037 and 900 increase in population.	Major Positive – Improved access to the cities results in increase of 4400 jobs in the corridor by 2037 and 1400 increase in population.
STAG Integration		Minor Positive – Contributes towards many of the aims of current Policy and Planning aspirations.	Moderate Positive – Close to current Policy and Planning aspirations.	Minor Positive – Contributes towards many of the aims of current Policy and Planning aspirations.	Minor Positive – Contributes towards many of the aims of current Policy and Planning aspirations.	Moderate Positive – Close to current Policy and Planning aspirations.	Major Positive – In line with current Policy and Planning aspirations.
STAG Accessibility & Social Inclusion		Minor Positive – improved transport options (Journey time reductions) for those without access to car.	Moderate Positive – improved transport options (significantly improved frequency) for those without access to car.	Neutral – all impacts negligible.	Minor Positive – Reduction of trips from bypassed towns would result in improved local accessibility.	Moderate Positive Reduction of trips from bypassed towns would result in improved local accessibility.	Moderate Positive Reduction of trips from bypassed towns would result in improved local accessibility.
STAG Cost to Public Sector (2014 prices)		£100-250m Doesn't include costs for rolling stock or additional operating costs/maintenance	£100-250m Doesn't include costs for rolling stock or additional operating costs/maintenance	£100-250m	£250-500m	£500m-1bn	£1.5bn-2bn
BCR		0-0.5 TUBA only	0.5 – 0.75 TUBA only	0-0.50	0.5-0.75 TUBA + accidents only	1-1.25 TUBA+ accidents only	0.75- 1 TUBA + accidents only
BCR (WEBS)		0-0.5	1.0-1.25	0-0.5	0.75-1	1.25-1.5	1-1.25
BCR (WEBS+Driver Frustration)		0-0.5	1.0-1.25	0-0.5	0.75-1	1.25-1.5	1-1.25



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