7.4 Corridor 4: Aberdeen to Inverness

7.4.1 Setting the Context

Corridor 4 extends from the outskirts of Aberdeen to Inverness and from the Moray Firth coast southwards towards the Cairngorms, as shown in Figure 7.4.1. It is approximately 161 kilometres in length and connects the cities of Aberdeen on the northeast coast of Scotland (approximate population 177,000[376]) and Inverness on the north-west (population 41,000[377]) with intermediate towns including Elgin and Inverurie. Smaller towns such as Forres and Nairn have populations of 10,000 people or less. Huntly and Keith have populations of 5,000 people or less.

The population of the Highland Council area that serves Inverness is forecast to increase by almost four per cent by 2022, whilst the Moray Council area that serves Elgin and surrounding towns is forecast to decrease by less than one per cent[378]. Growth of three per cent is projected in Aberdeenshire (which covers Huntly and Inverurie) offsetting a forecast decline in the city of Aberdeen itself[378]. Housing development at Nairn and the development of a number of new communities along the A96 will result in an increase in demand to travel along the route, particularly on the eastern approach to the Inverness and the western approach to Aberdeen[379].

It is forecast that there will be a small increase in employment in Aberdeenshire and little change in Moray, with some employment growth occurring in Aberdeen City and the Highlands[377]. Figures 7.4.2 shows areas with the greatest level of change in employment and population.

The economic inactivity rate within the Highlands and Aberdeenshire was around 16 per cent in 2005 and around 20 per cent within Moray. This is slightly below the Scottish average of 21 per cent[378]. Income levels for the corridor range from £362 per week in Moray to £446 per week in the Aberdeenshire, ranging from 88 per cent to 108 per cent of the average for Scotland (£412)[380].

The oil industry in Aberdeen provides the significant economic activity not just for Aberdeen, but for Scotland as a whole. Aberdeen is also the third most important fishing port in Scotland. Both elements impact travel demand within this corridor.

Inverness has a buoyant economy and vibrant tourist industry. Examples of growth in recent years include the relocation of the Scottish National Heritage headquarters to Inverness.

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[376] General Register Office for Scotland – Mid 2004 Population Estimates http://www.gro-scotland.gov.uk/files1/stats/04mid-year-estimates-localities-table3.xls
[377] TELMoS
[378] Scottish Economic Statistics 2006, table 4.3
[379] Inverness City-Vision (Inverness City Partnership), May 2006
[380] Scottish Economic Statistics 2006, table 4.20

The economies of Moray and Aberdeenshire have grown slightly in recent years. Inverurie has experienced economic and population growth since the oil boom in Aberdeen City. Elgin has also seen an increase in manufacturing in recent years.

In addition, the corridor has significant transport hubs. As well as the ports and stations within the two cities, both Aberdeen and Inverness airports are located within the corridor itself. Both airports provide access to the islands and other UK airports, and Aberdeen also provides flights to international destinations and access to oil rigs. Both railway stations provide access to Glasgow, Edinburgh and other UK cities, and have a Caledonian Sleeper service to London.

Car ownership in the corridor, measured as a percentage of households with access to a car, is generally well in excess of the national average of 67 per cent. The rural areas of Aberdeen have a particularly high car ownership reflecting the years of economic well-being that the oil industry has brought about:

- Aberdeen City: 66 per cent;
- Aberdeenshire: 82 per cent;
- Moray: 76 per cent; and
- Highland: 75 per cent[381].

The recently completed Aberdeen to Inverness Transport Corridor Study Pre-Appraisal report identified problems and opportunities along the corridor, established local transport planning objectives addressing these problems and sifted a range of transport improvement options that meet the established transport planning objectives. This study was considered in the assessment of this corridor[382].

[381] Scotland's Census 2001: www.scrol.gov.uk Table KS17
[382] Scott Wilson: Aberdeen to Inverness Transport Corridor Study; STAG Pre-Appraisal Final Report, April 2007

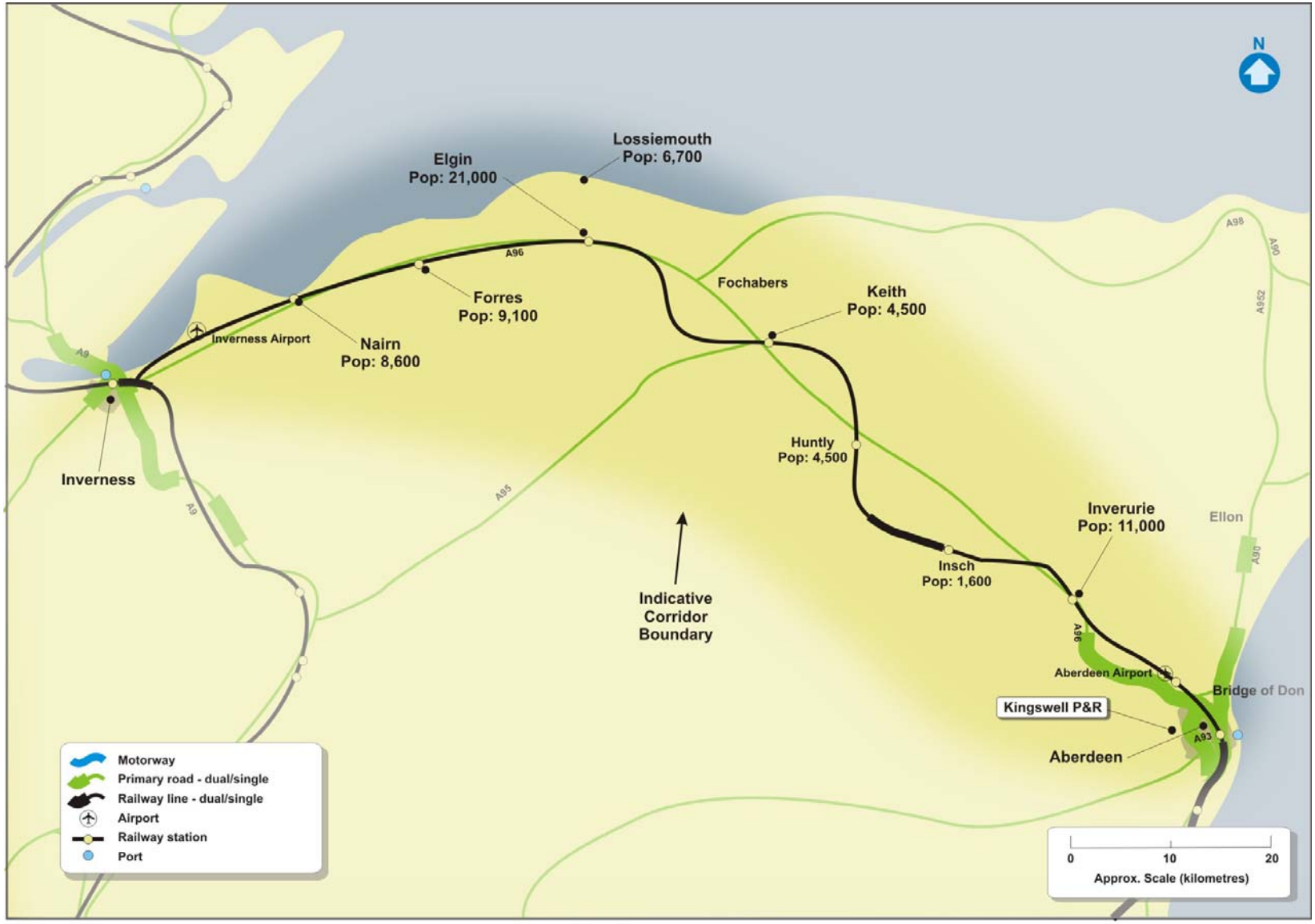

Figure 7.4.1: Setting the Context, Corridor 4 - Aberdeen to Inverness

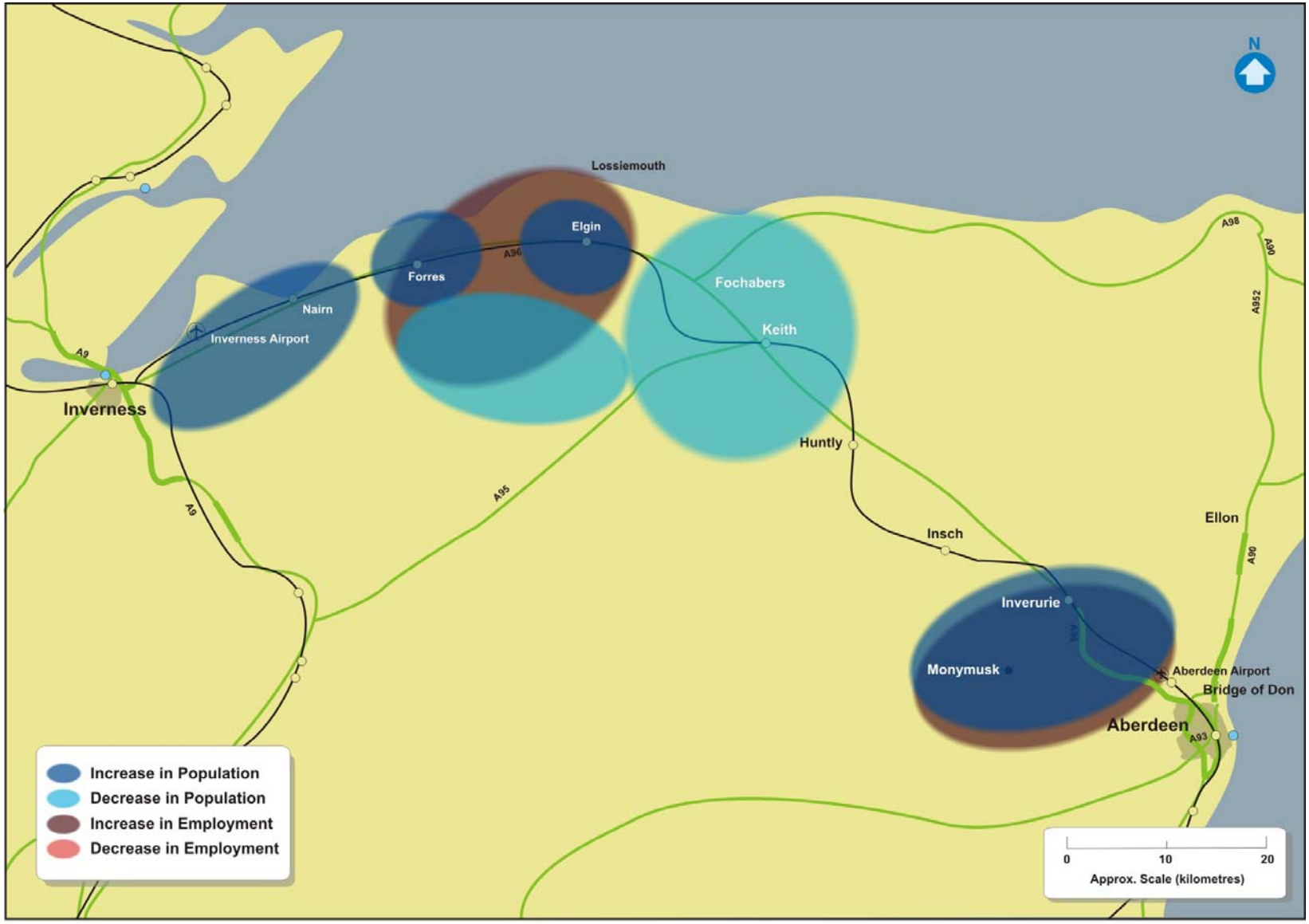

Figure 7.4.2: Changes in Population and Employment, 2005 & 2022, Corridor 4 - Aberdeen to Inverness

7.4.2 Transport Networks and Operations

Infrastructure and Services

The principal elements of the transport network that play a national strategic role are shown in Figure 7.4.1.

The A96 is the main trunk road for the corridor. Apart from a short section of dual carriageway between Aberdeen and Port Elphinstone and on the eastern approach to Inverness, the road is single carriageway with limited passing opportunities and include at-grade junctions within the corridor extent. The A96 passes through the following population centres within the corridor: Inverurie, Huntly, Keith, Elgin, Forres, Fochabers, Mosstodloch and Nairn. Between the towns the national speed limit applies. Other important elements of the network include:

- A9 / A96 Raigmore Interchange links Inverness and Elgin to Perth, as well as to other key Highland towns; and
- A96 / A90 links Aberdeenshire to Dundee, Perth and Central Scotland.

Most freight on this corridor is transported by road. As a result the HGV traffic on the A96 can cause bunching of vehicles due to the limited overtaking opportunities available.

The corridor has a rail network, with rail services between Aberdeen and Inverness serving a number of intermediate settlements and connecting to services to Glasgow, Edinburgh and to England, and Kyle of Lochalsh, Wick and Thurso to the north and west. The line between Aberdeen and Inverness is largely single track with passing loops. There are 10 trains per day in each direction between Inverness and Aberdeen.

In terms of recent improvements, Aberdeen railway station has benefited from significant investment under the First ScotRail franchise which is delivering a range of benefits including improved access, security and facilities; with the installation of two new lifts, CCTV cameras, ticket vending machines, gates and increased car parking[383]. The station itself is also well integrated with the adjacent Aberdeen bus station and a taxi rank located outside the entrance to the rail station catering for passengers using both stations.

The road and rail networks perform the dual function of strategic links and local access with many at-grade junctions and several stations on the local rail network. The road network provides key access to Aberdeen and Inverness airports. In addition Aberdeen Airport is served by rail via the nearby station at Dyce.

Approximately two buses per hour run between Aberdeen and Inverness between 08:00 and 22:00. In addition a number of local services to and from Aberdeen and Inverness provide for local demand.

[383] Partnership working through First ScotRail, Network Rail and Hammerson along with Miller Construction

The major port at Aberdeen is a key transport link for the north of Scotland providing lifeline ferry services to The Orkney and Shetland Islands. The port has no car park, so passengers have to use a nearby national car park on Ship Row. The corridor also provides access to several small fishing ports along the Moray Firth coast.

With the exception of Elgin and the soon to be completed Raiths Farm terminal in Dyce, there are no other rail freight facilities currently in regular use on this corridor, although facilities do exist at Inverurie, Huntly and Keith. However, improvements have been completed on the Mossend to Elgin freight route, which will increase rail use for this section.

The principal interchange locations on the corridor are:

- Aberdeen railway station (interchange for corridor services and ferry services to The Orkney and Shetland Islands);
- Inverness railway station (interchange for rail and local bus services); and
- Dyce railway station (interchange with Aberdeen Airport).

Further details of these interchanges are provided in the sections of this report dealing with Aberdeen and Inverness.

An integrated ticket is available for rail journeys into Inverness and Aberdeen in the form of the *PLUSBUS* ticket. This ticket covers rail journeys into Inverness and Aberdeen and unlimited bus travel within the city.

Asset Management

In 2007, 15 per cent of the trunk road network pavement[384] in this corridor is judged to require structural strengthening as it has no theoretical residual strength. This compares with a national level of four per cent[385]. Under Transport Scotland's planned maintenance schedule, the net figure for the corridor is expected to fall to 10 per cent by 2012.

Further details on asset management, including bus and rail, are provided in Chapter 4.

Demand Management

There are no bus priority measures in the corridor at present. Aberdeen has invested in a 950 space Park-&-Ride facility in Kingswells[386] to serve commuters and leisure trips from the west of the city.

[384] Transport Scotland SERIS Database
[385] STS No. 25 (2006) Table 5.5
[386] Aberdeen City Council: www.aberdeencity.gov.uk

Programmed Schemes

The following are programmed schemes and developments in Corridor 4, as shown in Figure 7.4.3:

- Aberdeen Western Peripheral Route; a dual carriageway from Stonehaven to Potterton, this will bypass the city and some of the busier sections of the A96 and it is expected to reduce congestion within Aberdeen;
- A96 Threapland Junction Improvements Project;
- A96 Fochabers and Mosstodloch Bypass Project;
- enhanced station facilities at Aberdeen to make the station more accessible and safe for passengers;
- platform extension at Elgin;
- platform extension at Insch; and
- Raiths Farm, Dyce, rail freight terminal.

Also of relevance is the Highland Council's consideration of the Inverness Southern Distributor Road.

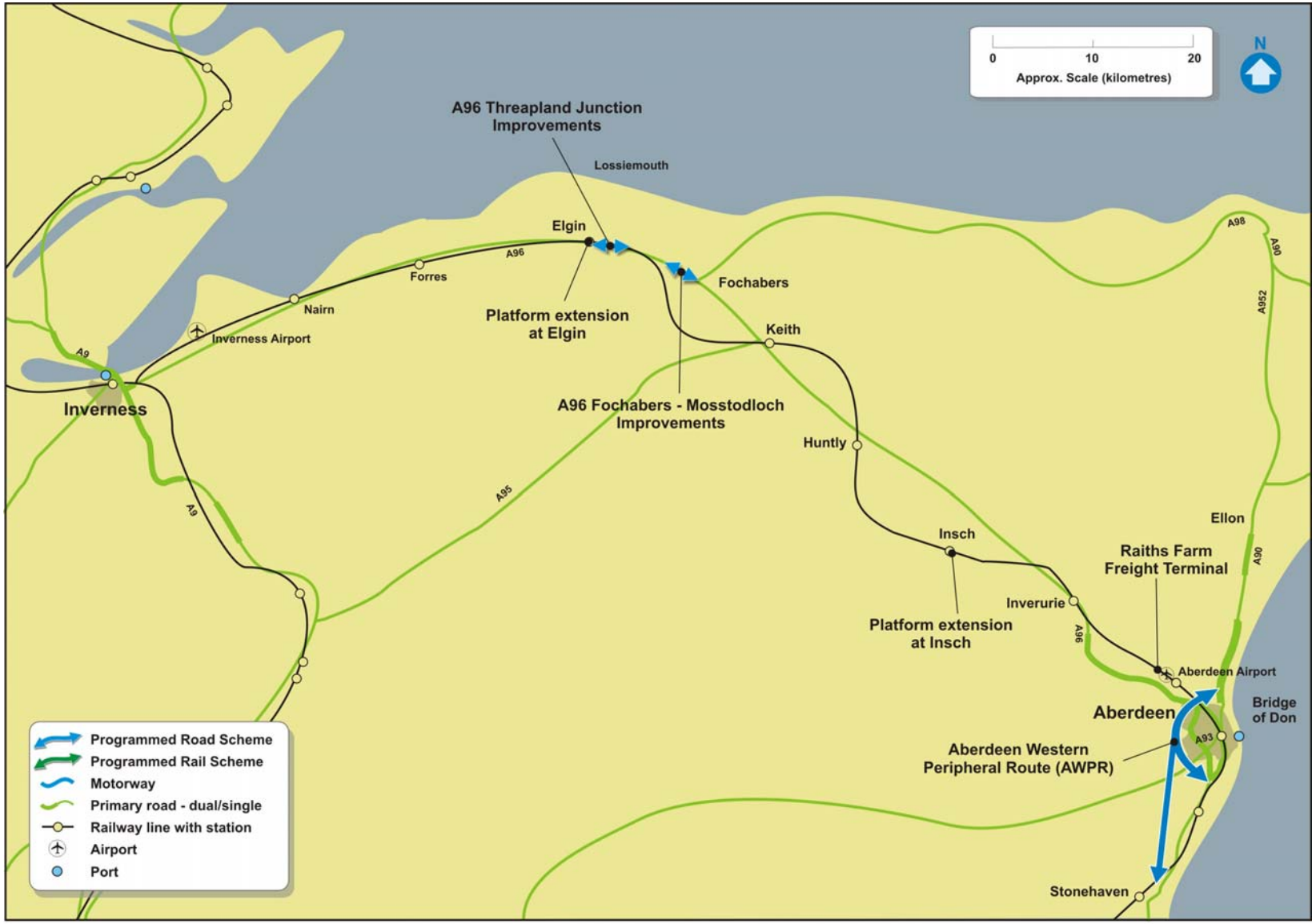

Figure 7.4.3: Programmed Transport and Land Use Developments, Corridor 4 - Aberdeen to Inverness

7.4.3 Travel Patterns

TMfS:05 does not adequately cover the full extents of Corridor 4. As such, data has been taken from the emerging Highland model which is being developed further in conjunction with TMfS:05, which became available for use in later packages at the end of 2007. The Highland model gives a more robust representation of travel in Corridor 4 however as the corridor spans the two models it may not necessarily present the same travel patterns as shown where TMfS:05 has been used.

Travel patterns in the Corridor 4 are graphically represented in Figure 7.4.4. In addition, a summary of demand levels and mode share is included in Table 7.4.1.

Table 7.4.1: Summary of Demand (12 hour) and Public Transport Share[387]

		Between Corridor and Inverness	Between Corridor and Aberdeen	Within Corridor	Between Corridor and other destinations	Total Trips
2005*	Total Trips	23,800	39,700	161,200	42,800	267,500
	% of Corridor	9%	15%	60%	16%	100%
	PT Trips	3,600	2,400	14,000	1,400	21,400
	PT Share	15%	6%	9%	3%	8%
2022	Total Trips	30,000	50,000	203,100	54,000	337,100
	% of Corridor	9%	15%	61%	15%	100%
	PT Trips	4,500	3,000	17,600	1,800	26,900
	PT Share	15%	6%	9%	4%	8%
Change	Total Trips	+26%	+26%	+26%	+26%	+26%
	PT Trips	+25%	+25%	+26%	+29%	+26%

*Uses TMfS:05H

[387] TMfS:05H

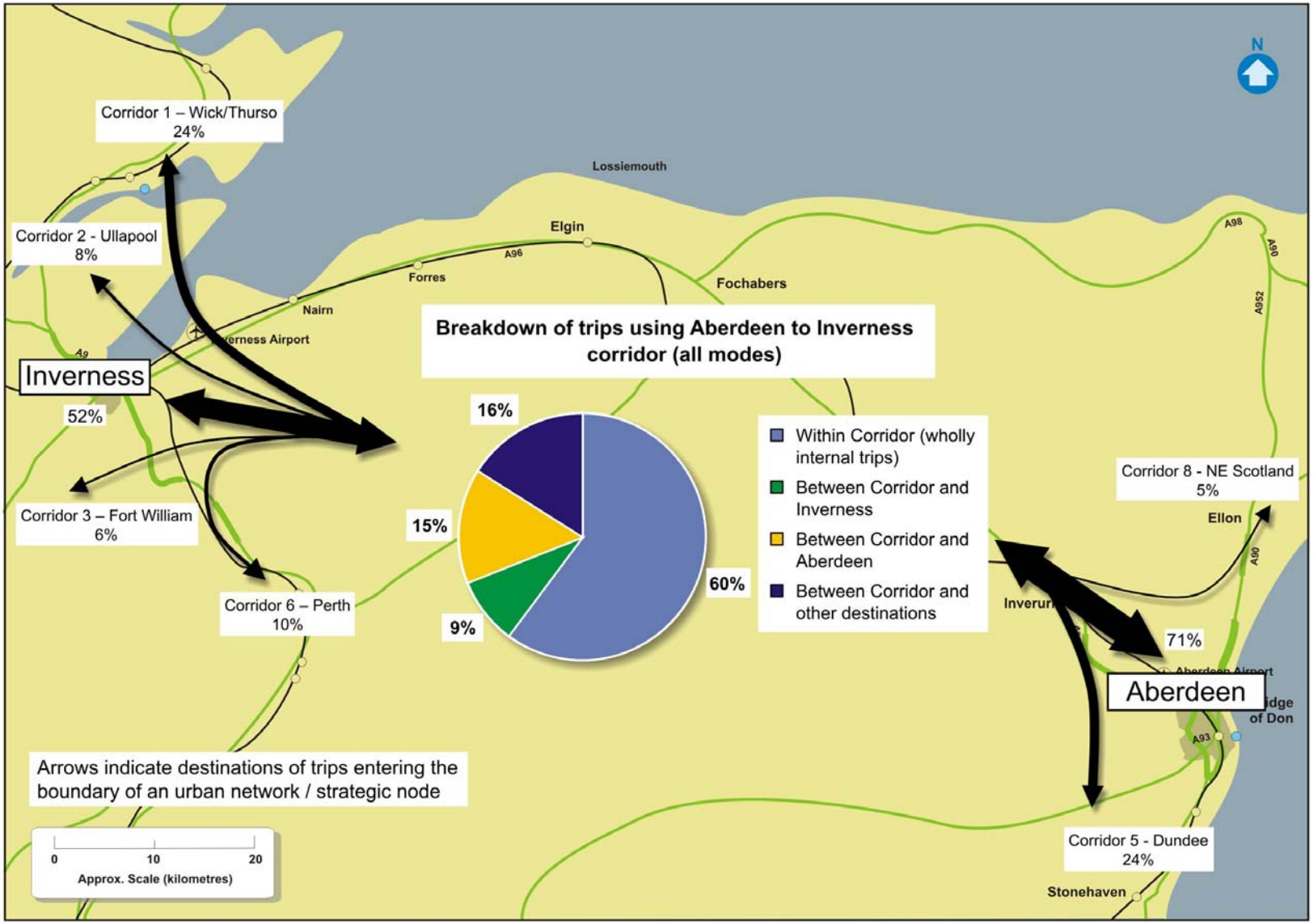

Figure 7.4.4 Travel Patterns 2005, Corridor 4 – Aberdeen to Inverness

The majority of travel demand is between settlements in the corridor and the cities at either end, principally Aberdeen. Public transport provides about nine per cent of trips within the corridor in 2005. Trips between other destinations and the corridor have a lower public transport share of around three per cent. Current forecasts of future demand indicate that these proportions will be similar in 2022.

The AADT levels can be up to approximately 35,000 vehicles in the dual carriageway sections of the A96 near Inverness and Aberdeen, and drop to approximately 7,000 vehicles in the middle of the corridor on the single carriageway sections. Approximately 11 per cent of the traffic on the A96 is HGV[388].

ATC data from the SRTDb gives a figure of approximately nine per cent HGV traffic on the A96 east of Blackburn[389]. Unfortunately the ATCs along the single carriageway sections of the route give only volumetric information, and thus HGV percentages cannot be calculated.

In 2005 there were approximately 500,000 bus passenger journeys and 14,800 bus journeys in Corridor 4 covering a total of 2,715,000 vehicle kilometres. Travelling the length of the corridor between Aberdeen and Inverness, the cost of a single adult fare is £9.00.

The railway stations in this corridor have a total throughput of some 1 million passengers per annum (2005), with Dyce and Elgin the busiest intermediate stations[390].

The port at Aberdeen handles around 140,000 passengers and 22,700 vehicles travelling to or from the Orkney and Shetland Islands each year and in 2006 freight levels surpassed five million tonnes of freight per year[391]. Access to the port is mainly by road. Railway access in the Waterloo Quay area of the port is not promoted and is used for mainly storing freight. In March 2006 a £3.5 million contract was awarded to provide more room at the port, and improve rail access[392].

In 2005 Aberdeen Airport had a throughput of around 2.9 million passengers and 4,100 tonnes of freight per year, while Inverness Airport handles around 589,000 passengers per annum[393]. Both airports are expected to grow, with annual passenger numbers forecast to rise to between three and four million through Aberdeen[394] and around one million through Inverness[395] by 2015.

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[388] HITRANS, Oct 2006
[389] SRTDb
[390] Rail industry LENNON data (Station Usage 2004/2005)
[391] STS No. 25 (2006), Table 10.15
[392] www.aberdeen-harbour.co.uk/news_29_05_07.htm
[393] STS No. 25 (2006), Table 9.6, 9.13
[394] Aberdeen Airport Master Plan, Dec 2006, BAA
[395] Strategic Plan 2006/2016, Highlands and Islands Airports Limited

7.4.4 Performance Review

Journey Times and Connections

This section addresses the following questions from Table 3.1:

- Does the network offer competitive journey times?
- Is the network operating efficiently and reliably?
- Where are the delays and when do they occur?

The main trunk road on the corridor is the A96. This contains some dual carriageway sections north of Aberdeen and east of Inverness, but is single carriageway over most of its length and includes at-grade junctions that have an impact on operation. Figure 7.4.5 shows the average journey times on the A96.

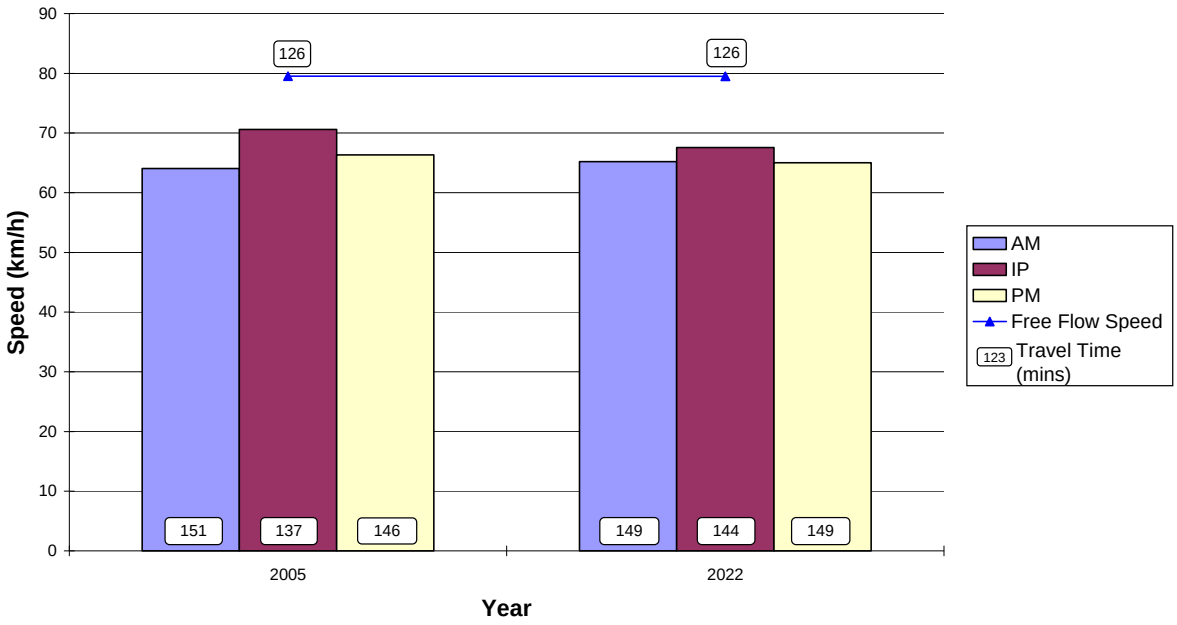

Figure 7.4.5: Average Road Speeds (Corridor 4)[396]

Travel time in 2005 ranges from 2 hours 17 minutes in the off peak to 2 hours 31 minutes in the morning peak. This is in contrast to the free flow travel time of 2 hours 6 minutes. By 2022 there is less variation in the travel time with the off peak taking 2 hours 24 minutes and both the morning and evening peak taking 2 hours 29 minutes. The free flow travel time remains unchanged at 2 hours 6 minutes.

[396] TMfS:05

Figure 7.4.6 shows that the journey times on the A96 between Aberdeen and Inverness are expected to remain largely unchanged over the period, reflecting the improvements at the eastern end following the completion of the Aberdeen Western Peripheral Route. However due to the lack of overtaking opportunities and high traffic volumes, vehicle speed is largely constrained by the 11 per cent HGVs, that are restricted to a maximum speed of 40mph (64kph), and also conflict with local trips within and adjacent to the numerous towns in the corridor. Traffic speed through the day remains close to the free-flow speed, indicating low levels of current and future congestion over the corridor as a whole.

The A96 passes through a number of local communities along its length. As a result there are localised issues of congestion which impact journey time reliability. In addition, trips travelling from end to end can generate a mixture of strategic and local trips within the corridor, which can in turn result in local community severance. A particular example of this local congestion which impacts strategic traffic is at Inveramsay Bridge, to the northwest of Inverurie. At this location, due to height restrictions passing under the rail line, the A96 is reduced to single file with signal control at either side of the bridge. Furthermore, approximately 2 per cent of journeys from Balmeddie to Muggiemoss roundabout have journey time reliability problems, however, only journeys approaching Aberdeen will be affected[397]. This means that journey times in the morning and evening peaks are 9 per cent or 12 minutes longer than the daily average[398]. It is considered that the programmed Aberdeen Western Peripheral Route is likely to mitigate this issue.

These AADT levels would indicate that the A96 is within its design capacity at present, however the expected population and employment growth, is expected to increase traffic demand above theoretical capacity levels. It is forecast that the sections over capacity will be at either end of the corridor on approach to Inverness and adjacent to Inverurie and also at localised areas such as Elgin. In addition, although the dual carriageway sections between junctions on approach to Aberdeen may stay within capacity, delay is likely to be experienced at the at grade junctions themselves. This is primarily a result of increased levels of commuter trips during peak periods towards Aberdeen.

Travel time isochrones are shown in Figure 7.4.6[399] for trips from Aberdeen along the corridor in the evening peak. This schematic provides a comparison of road and rail travel times and indicates that rail services, although infrequent, are generally comparable against travel by road. Bus services from Aberdeen to Inverness are uncompetitive compared to car and rail, primarily due to the number of stops made on the route.

Network Rail's Route Utilisation Strategy[400] does not identify overcrowding on rail services in the corridor, although the TMfS indicates that peak services are busy, particularly between Dyce and Aberdeen[401].

[397] TMfS:05
[398] http://scottishexecutive.itisholdings.com/
[399] Journey times for bus/rail include a 20 minute walk/wait time
[400] Network Rail: Scotland Rail Utilisation Strategy March 2007
[401] TMfS:05

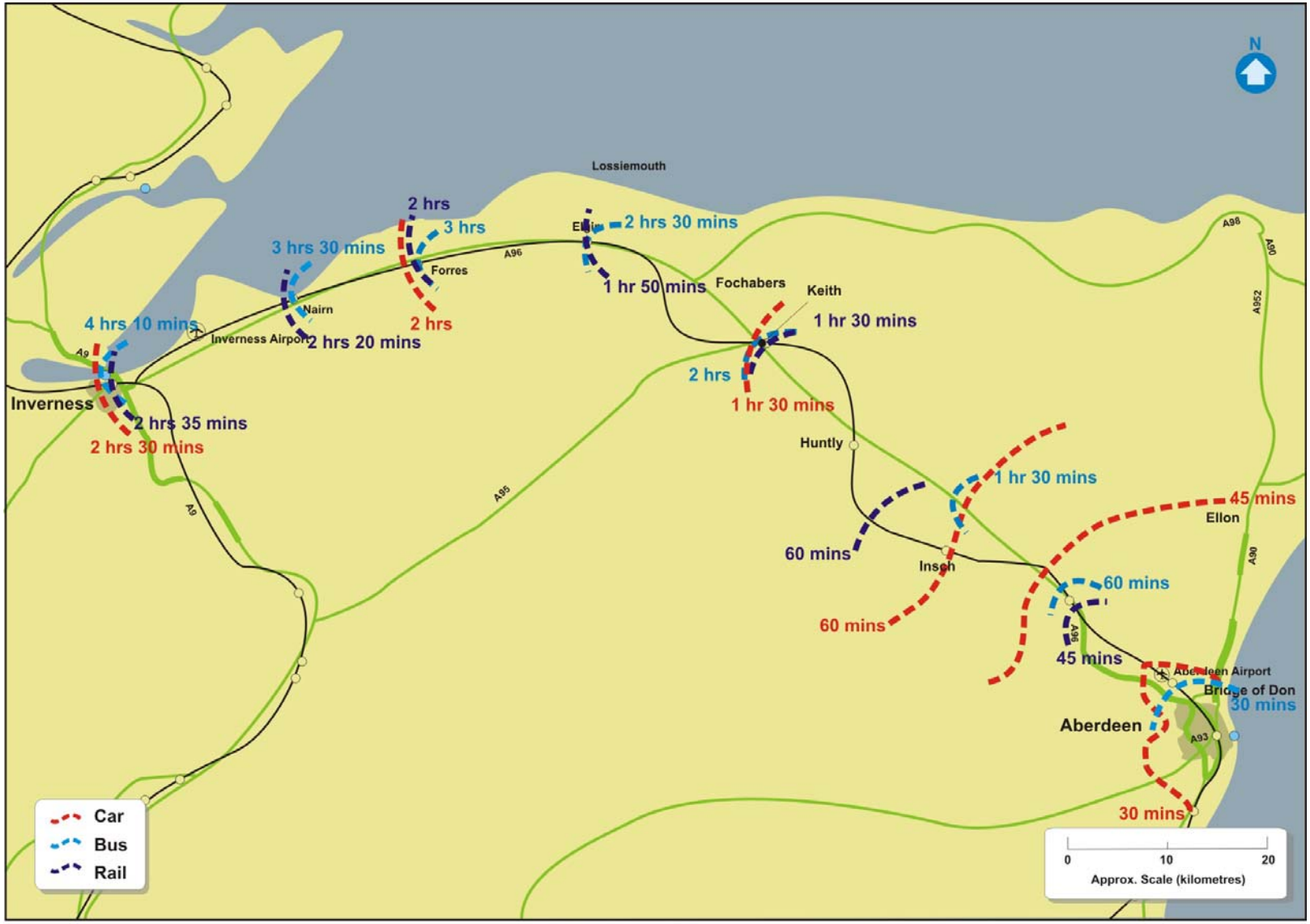

Figure 7.4.6: Journey Time to Aberdeen by Road/Rail (2005 AM peak), Corridor 4 - Aberdeen to Inverness

Emissions (CO_2 only)

This section of the report addresses the issue:

- What is the level of transport based emissions within the corridor?

CO_2 per person kilometres are forecast to drop from 107 tonnes / million person kilometres to 102 tonnes / million person kilometres between 2005 and 2022 in this corridor. This is a result of CO_2 emissions rising at a slightly lower rate than person kilometres between 2005 and 2022[402].

The road based transport network produced 209,500 tonnes of CO_2 in Corridor 4 in 2005. This equates to approximately three per cent of the total road based transport related CO_2 emissions in Scotland.

By 2022, it is forecast that CO_2 emissions in Corridor 4 will rise to around 212,000 tonnes, approximately three per cent of Scotland's road based transport related CO_2 emissions in 2022.

The rail network produced 4,500 tonnes of CO_2 in Corridor 4 in 2007. This equates to approximately six per cent of the total rail based CO_2 emissions in Scotland[403].

Therefore, it is estimated that the road and rail based transport network collectively produced 214,000 tonnes of CO_2 in Corridor 4 in 2005. This equates to approximately three per cent of the total road and rail based transport related CO_2 emissions in Scotland.

Quality / Accessibility / Affordability

The following paragraphs address the issues of:

- Does public transport provision match origin / destination analysis?
- How competitive is public transport compared with the car?
- Do capacity issues impact on public transport service?
- How safe is the network?

There are regular rail services which potentially enable effective business interaction between the centres of this corridor. The bus services, although frequent, do not provide a competitive alternative to either travel by rail or by private car and therefore do not contribute to effective business interaction between and among the centres of this corridor.

[402] TMfS:05
[403] AEA (2001) Rail Emission Model Final Report; www.nationalrail.co.uk and www.networkrail.co.uk

Bus services in the corridor include commuter services into Inverness and Aberdeen, and longer distance services from Aberdeen to Inverness and local services between the settlements in the corridor. Table 7.4.2 provides an assessment of bus service quality on the strategic long distance services in the corridor on a scale of one to five, with one being 'poor' and five being 'excellent'.

Table 7.4.2: Assessment of Bus Quality[404]

Service Numbers	Annual Journeys	Reliability	Frequency	Simplicity	Value	Coverage	Vehicle Quality
Stagecoach	15,000	4	4	4	3	4	4

With the exception of rail services between Aberdeen and Inverness, public transport is not very competitive with private transport in this corridor, a situation forecast to continue into the future. There are no major concentrations of people without cars in areas with a greater dependency on public transport for access to key services. For those who are, and in common with other areas in the Highland council area, access to key services is maintained through innovative land-use and travel schemes, often dependant on public sector support. These include demand-responsive community transport, mobile services (e.g. libraries, food vans, and post-buses) and multi-purpose single site operations (e.g. post-offices with grocery services).

The accident rate on the A96 (32.3 accidents per 100MVKm) is significantly greater than the national average for this road type (15.5 accidents per 100MVKm). The fatal accident rate on the route (1.45 accidents per 100MVKm) is also significantly greater than the national average (0.76 accidents per 100MVKm). Initial analysis of severe accident clusters indicated a number of locations on the A96, particularly at or near junctions, where road safety may need to be addressed[405].

Regarding security on public transport, women on the whole felt more 'unsafe' on trains in the evening than men. However overall, the percentages of commuters expressing concerns for their safety were considerably lower than the national average for Scotland[406].

[404] UK Bus Statistics (Qualititative Assessment – 1: very poor; 5: excellent)
[405] Transport Scotland SERIS database
[406] Scottish Household Survey 2003/2004: Perceptions of safety from crime during evening bus/rail travel

Summary of Infrastructure and Operational Constraints

Figure 7.4.7 shows areas of constraint on the network.

Key constraints and congestion points include:

- inadequate overtaking opportunities on A96;
- congestion on the A96 on approach to, and through urban areas;
- 40mph speed restriction for HGVs;
- capacity constraint at Inveramsay Bridge, northwest of Inverurie;
- railway station car parks at capacity;
- single track railway line and location of passing loops between Aberdeen and Inverness restricts timetable patterns, the number of paths and future development options;
- single track and signalling system limits rail operations; and
- the platform lengths at Elgin and Insch stations prevent the use of six carriage trains.

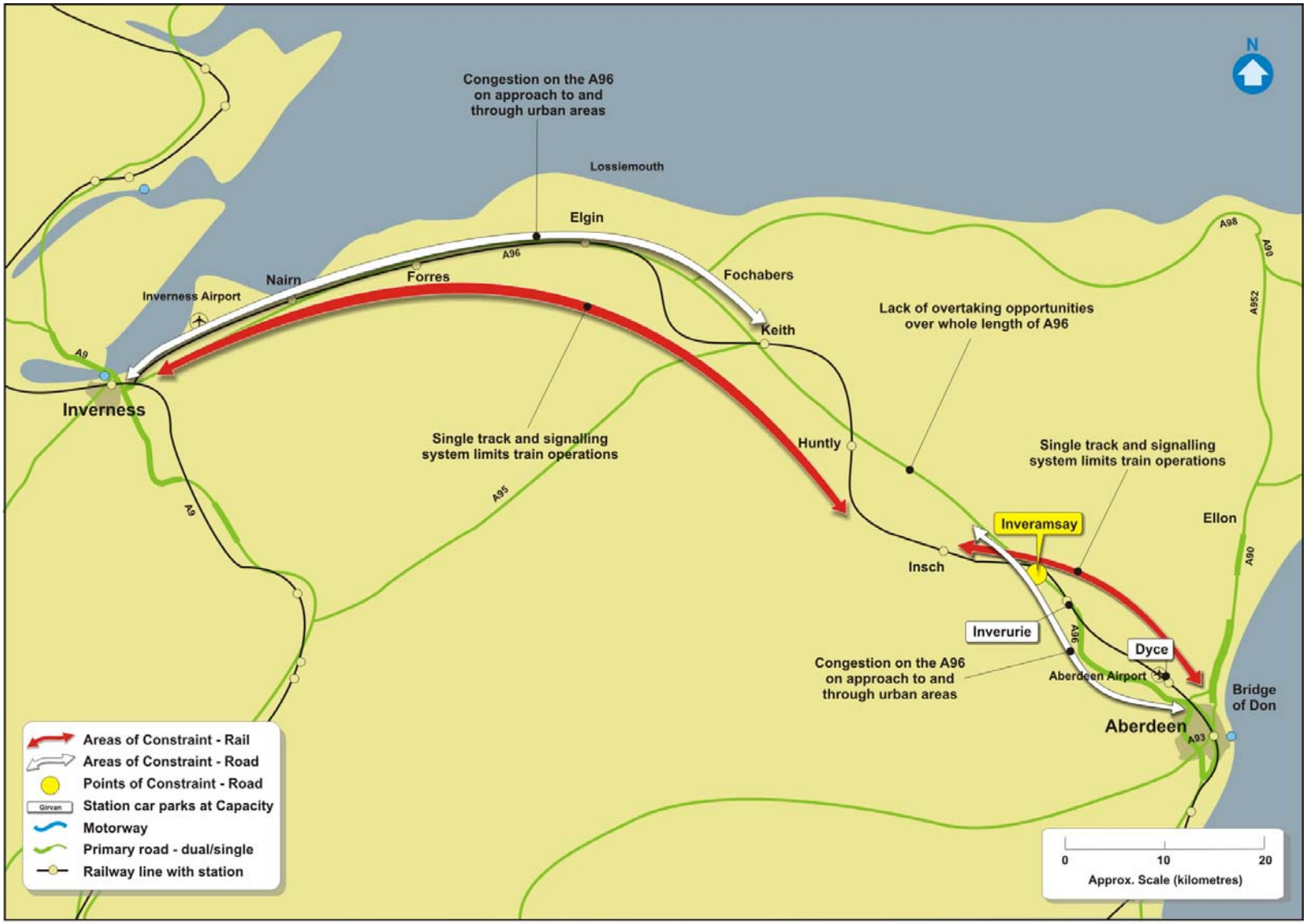

Figure 7.4.7: Areas of Constraint on the Network, Corridor 4 - Aberdeen to Inverness

7.4.5 Summary and Conclusions

Overall, how well does the transport network perform?

Overall the transport network performs reasonably. About two thirds of trips are between settlements along the corridor and Aberdeen. Congestion occurs in the peak periods at either end of the corridor, on the approaches to Aberdeen and Inverness. In addition, localised congestion occurs at a number of towns along the A96, such as Elgin at Inveramsay Bridge and there are journey time reliability issues. The interaction of mainline and side road traffic at priority junctions and at-grade roundabouts, increases congestion and impacts journey time. The presence of HGV traffic, high traffic demand and lack of overtaking opportunities on the mainly single carriageway also affects operation.

This corridor exhibits higher than average accident rates and severity ratios, than would be expected for a route of this nature. A number of accident clusters have been identified.

A lack of train paths between Aberdeen and Inverness places constraints on the operation of the rail network. This results in a relatively infrequent and irregular timetable pattern. As a result although end to end journey times for rail are comparable to car, the limited frequency growth results in the rail service being less competitive than it could be. Railway station car parks at capacity is also an issue in terms of competitiveness with car travel.

With bus journey times being considerably longer than either car or rail this mode does not offer an attractive option for end to end journeys. Bus does however provide a valuable service to the local communities along the route as well as for commuters travelling to Aberdeen and Inverness.

Will the transport network meet future demand, particularly in areas of economic activity?

Significant growth in employment and population is planned on this corridor to the east of Inverness as well as continued growth at Inverness Airport. This growth in demand will place an increased pressure on the road and rail network. On the A96, capacity thresholds are likely to be exceeded at localised points such as Elgin and Inverurie, and also on approach to both Aberdeen and Inverness. On the rail network, the greatest impact is forecast to be experienced on the western sections of this corridor. These factors are expected to impact on the efficient operation of the network, particularly where the greatest demand occurs, thereby affecting demand between the major economic centres.

The construction of the Aberdeen Western Peripheral Route and the associated upgrades to the local road network will ease congestion in the Dyce area of the city and the western approaches to Aberdeen, and this will help to facilitate the planned employment growth in the area, including the growth in passenger numbers through Aberdeen Airport.

Along the length of the A96 localised congestion is expected to impact more heavily on the journey times as a result of the forecast increase in demand.

Programmed improvements on the rail network will include the platform extensions at Elgin and Insch to accommodate six-car trains. The completion of the rail freight terminal at Raiths Farm, Dyce and the gauge enhancement to Elgin, should help to encourage more freight onto the rail network to Aberdeen and beyond.

What are the key drivers that will impact on performance in the future?

The most significant external factor impacting on the performance of this corridor is the forecast growth in population and employment on the approaches to Inverness, coupled with the continuing increase in passenger numbers through Inverness and Aberdeen Airports, and the continuing growth in the employment areas adjacent to Aberdeen Airport.

What are the key problems associated with delivering the KSOs?

The construction of the Aberdeen Western Peripheral Route and a number of minor improvements proposed for the A96 will reduce journey times along the corridor, but will not improve congestion and delay at Dyce near the airport.

There is a high accident rate in comparison with the national rate for rural single carriageway roads.

In order for the rail network to provide a competitive alternative to the private car issues of frequency and timetabling will need to be addressed. In addition the lack of a rail connection to Inverness Airport could impact on the potential for the airport's sustainable growth.