

7.5 Corridor 5: Dundee to Aberdeen

7.5.1 Setting the Context

Corridor 5 extends from the southern outskirts of Aberdeen, through Aberdeenshire and Angus, to the northern and eastern outskirts of Dundee and is shown in Figure 7.5.1. The corridor had a total population of 156,000⁴⁰⁷ in 2004. The towns within the corridor are small; the main centres are Carnoustie, Arbroath, Forfar, Montrose and Stonehaven. The corridor is approximately 106 kilometres in length.

The A90 Trunk Road and the Dundee to Aberdeen railway line provide the strategic links between central Scotland, Dundee and the northeast of Scotland including The Orkney and Shetland Islands. The line also serves as a commuter route from Aberdeenshire to the city of Aberdeen and from Angus to the city of Dundee.

Between 2005 and 2022, the population in the corridor is projected to decline by approximately 13,000 people, a decrease of eight per cent⁴⁰⁸. Dundee is expected to have a small increase and Aberdeen a small decline. At the same time, the number of households in the area is forecast to increase by 1,700, a rise of two per cent⁴⁰⁷. Employment within the corridor is expected to remain fairly constant at 51,000 jobs, while declining by two per cent in Dundee and increasing by five per cent in Aberdeen⁴⁰⁷. Primary economic activity in the corridor includes agriculture and technology. The nationally important oil and gas industry has a considerable bearing on the economy of the northern part of the corridor and Aberdeen. Figure 7.5.2 shows the expected areas of changes in population and employment over the period to 2022.

Income levels for the corridor range from £390 per week in Angus to £446 per week in the Aberdeenshire, ranging from 95 per cent to 108 per cent of the average for Scotland (£412)⁴⁰⁹. The economic inactivity rate within Aberdeenshire was around 16 per cent in 2005 and around 19 per cent within Angus. This is slightly below the Scottish average of 21 per cent⁴⁰⁹.

Car ownership in the corridor, measured as a percentage of households with access to a car, is well above the national average of 67 per cent, which is typical of more rural areas:

- Aberdeenshire: 82 per cent; and
- Angus: 74 per cent⁴¹⁰.

⁴⁰⁷ TELMoS

⁴⁰⁸ Transport Scotland SERIS Database

⁴⁰⁹ Scottish Economic Statistics 2006, table 4.3, 4.20

⁴¹⁰ Scotland's Census 2001: www.scrol.gov.uk, Table KS17

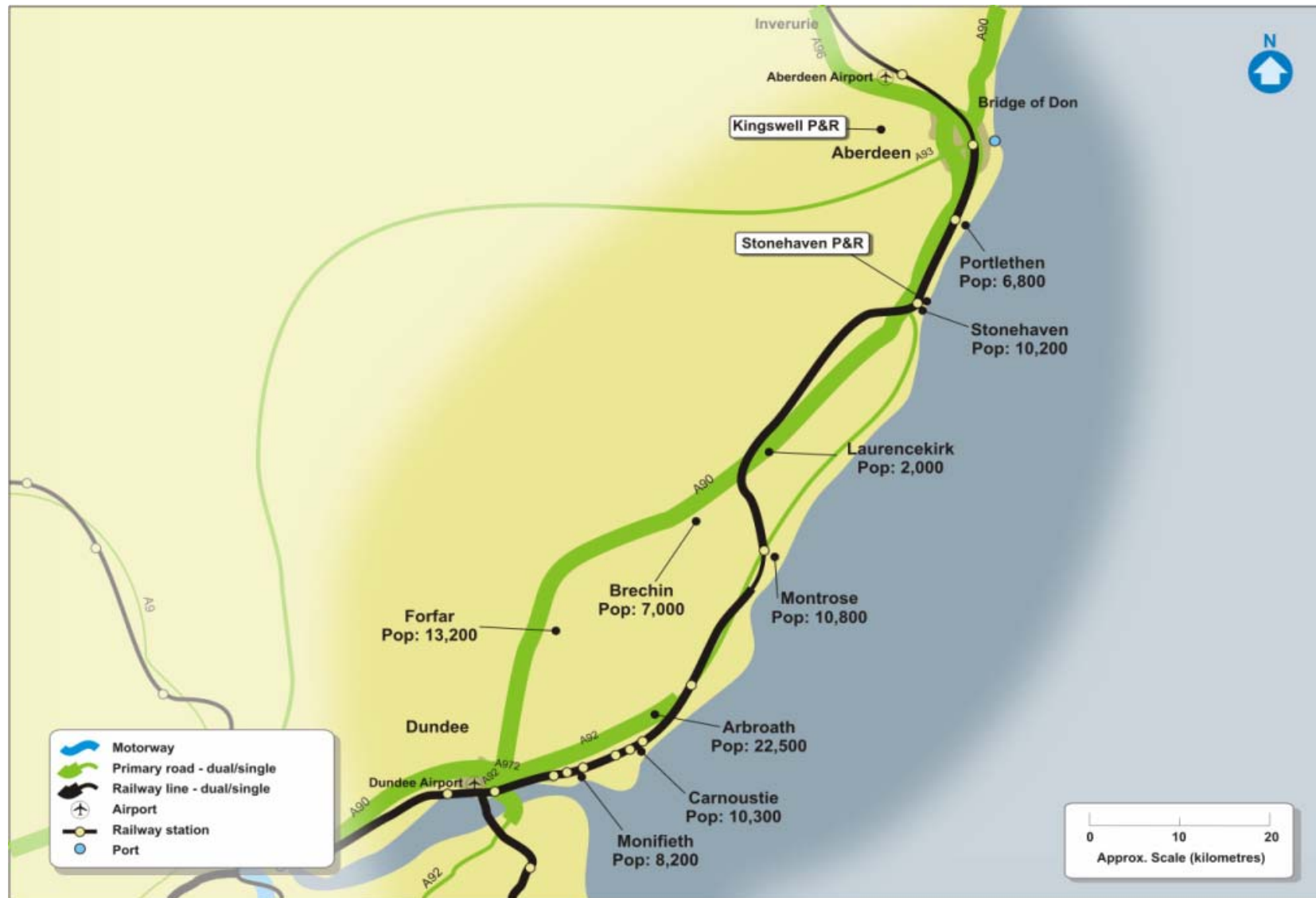


Figure 7.5.1: Setting the Context, Corridor 5 - Dundee to Aberdeen

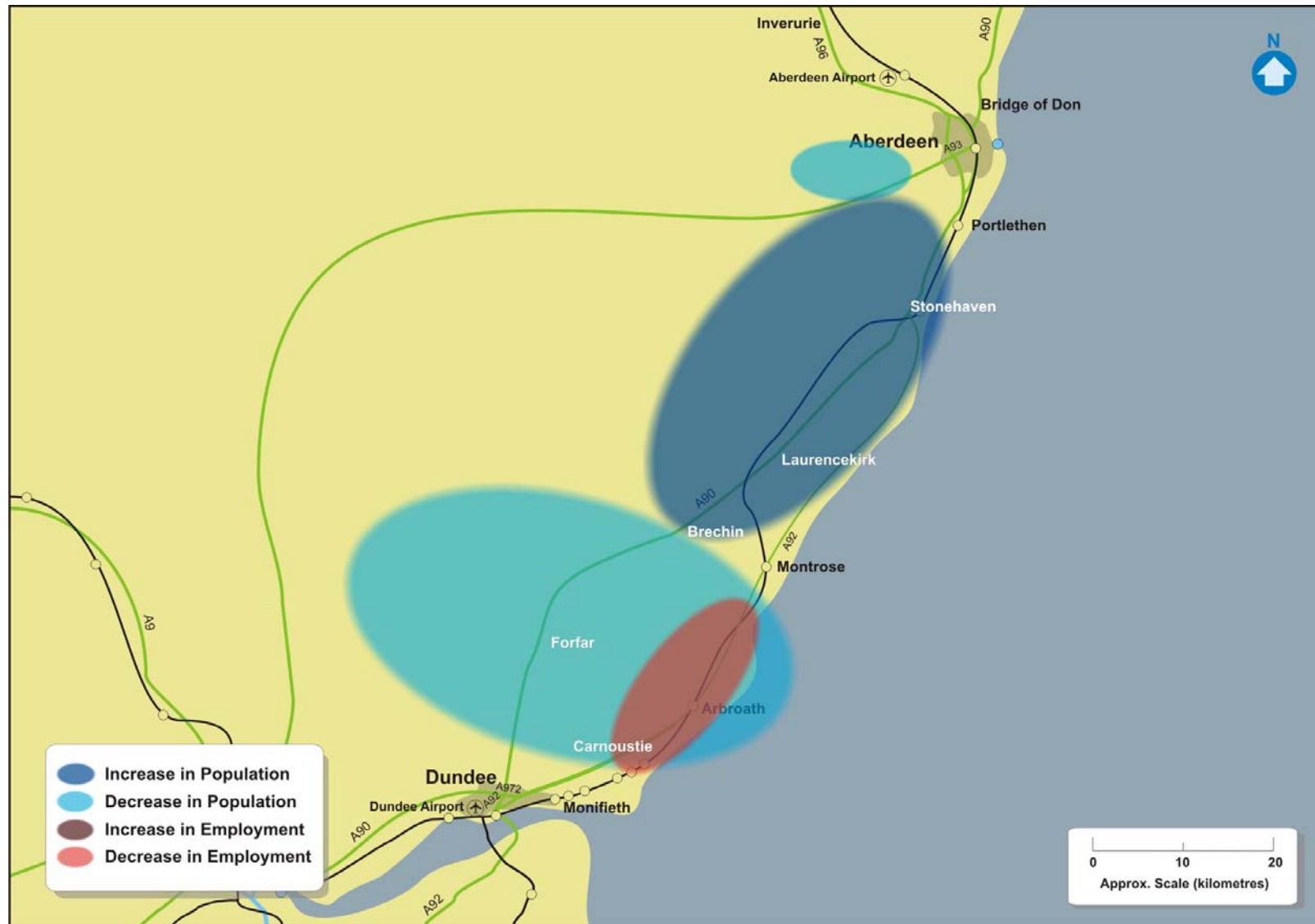


Figure 7.5.2: Changes in Population and Employment, 2005 & 2022, Corridor 5 - Dundee to Aberdeen

7.5.2 Transport Network and Operations

Infrastructure and Services

The key strategic elements of the transport network within this corridor are shown in Figure 7.5.1.

The main spine road of Corridor 5, consisting of the A90 Dundee to Aberdeen dual carriageway trunk road, comprises a mixture of grade separated and at-grade junctions. The corridor also encompasses the parallel A92 (non-trunk) coastal route, between Dundee and Stonehaven via Arbroath. The A92 is of varying standard along its length but the section between Arbroath and Dundee has recently been upgraded to dual carriageway and serves as the main route for traffic between Montrose, Arbroath and Dundee.

A rail route between Dundee and Aberdeen runs the length of the corridor. The line is double track along much of its length, with a short single track section south of Montrose. The line provides through services to Glasgow, Edinburgh and England as well as commuter services into Dundee and Aberdeen from several intermediate stations in the corridor. Service patterns are generally:

- One train per hour between Aberdeen and Glasgow;
- One train per hour between Aberdeen and Edinburgh;
- Three trains per day between Aberdeen and London (National Express East Coast);
- One train per day between Aberdeen and Birmingham (Arriva Cross-Country);
- One overnight sleeper service between Aberdeen and London;
- Two daily freight services between Aberdeen and Central Scotland; and
- Additional weekly freight flows between Aberdeen and Central Scotland.

The largest bus operator in the corridor is Stagecoach, which operates two local networks. Stagecoach Strathclyde serves Dundee, Angus and Perth council areas linking the main population centres, including Dundee, Arbroath and Montrose. Stagecoach Bluebird is based in Aberdeen and operates as far south as Montrose. First Aberdeen also operates within the corridor, but predominantly covers Aberdeen and its suburbs.

Long distance services through the corridor are operated by Citylink in conjunction with the Stagecoach subsidiary, Megabus. The M9 service runs hourly between Glasgow, Dundee and Aberdeen with connections at Perth for Edinburgh.

There are 72 long distance bus services per day between Aberdeen and the corridor / central Scotland giving a capacity of approximately 3,600 seats per day in each direction. Service patterns are generally:

- Three services per hour between Aberdeen and Dundee;
- One service per hour between Aberdeen and Edinburgh; and
- One service per hour between Aberdeen and Glasgow.

There are freight only ports at Dundee and Montrose. Aberdeen's port caters for both freight and passenger movements including ferry connections to The Shetland and Orkney Islands. Ferries to Shetland run daily and to Orkney three or four times a week.

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

Asset Management

In 2007, eight per cent of the trunk road network pavement⁴¹¹ 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 cent⁴¹². Under Transport Scotland's planned maintenance schedule, the net figure for the corridor is expected to rise to nine per cent by 2012.

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

Demand Management

Bus journeys into Aberdeen from the corridor benefit from bus priority measures including bus lanes. There are also bus priority corridors in Dundee which are being extended into Angus, which include bus lanes and bus priority at traffic signals. These have a greater beneficial impact on the shorter commuting journeys into Aberdeen and Dundee from the corridor. There are currently no formal Park-&-Ride sites to the south of Aberdeen or in Dundee, although proposals are under consideration for the introduction of a Park-&-Ride facility on the southern periphery of Aberdeen.

Stations on the rail line in the corridor have total station car park facilities for approximately 200 cars, the largest of which is at Stonehaven, accommodating 62 cars⁴¹³.

The cost of parking in Aberdeen city centre is relatively high. This is part of Aberdeen City Council's policy of controlling parking to manage travel demand and to influence mode choice⁴¹⁴. Parking costs are generally lower in Dundee and are not used to manage travel demand.

⁴¹¹ Transport Scotland SERIS Database

⁴¹² STS No. 25 (2006) Table 5.5

⁴¹³ First ScotRail Station Facilities – www.firstgroup.com/scotrail

⁴¹⁴ Aberdeen City Council Local Transport Strategy

Programmed Schemes

The following programmed infrastructure schemes and developments that will affect the corridor are highlighted in Figure 7.5.3:

- New grade separated junction on the A90 north of Portlethen with associated bus Park-&-Ride facilities serving a housing development;
- Aberdeen Western Peripheral Route and other associated packages of the Aberdeen Modern Transport System;
- New station at Laurencekirk;
- Rail freight transfer depot at Blackhills of Cairnrobin, near Charleston;
- Signalling upgrade at Montrose to allow southbound freight trains to use the northbound passing loop;
- Raiths Farm rail freight terminal in Dyce, to replace the existing terminal at Guild Street, Aberdeen; and
- Loading gauge enhancement on the railway line between Central Scotland and Elgin to allow larger containers on freight trains to operate.



Figure 7.5.3: Programmed Transport and Land Use Developments, Corridor 5 - Dundee to Aberdeen

7.5.3 Travel Patterns

Travel patterns for the corridor are graphically presented in Figure 7.5.4. A summary of the most significant demand levels and public transport share in the corridor is included in Table 7.5.1.

Aberdeen is the main single destination from the corridor (48 per cent) reflecting the employment within the city and the Aberdeen suburbs at the north end of the corridor. Total trips to Aberdeen are expected to increase by seven per cent to 2022. Of the trips between the corridor and other destinations, the majority are travelling south through Corridor 11 to Perth and beyond or north through Corridor 4 towards Inverness.

The total volume of trips per day on the corridor is forecast to increase from 167,300 in 2005 to 187,400 in 2022, an increase of 11 per cent⁴¹⁵.

Table 7.5.1: Summary of Demand (12 hour) and Public Transport Share⁴¹⁶

		Between Dundee and Aberdeen	Within Corridor	Between Corridor and Dundee	Between Corridor and Aberdeen	Between Corridor and other destinations	Total Trips
2005	Total Trips	23,200	3,200	25,500	80,800	34,600	167,300
	% of Corridor	14%	2%	15%	48%	21%	100%
	PT Trips	2,300	<100	1,200	3,400	400	7,300
	PT Share	10%	<1%	5%	4%	1%	4%
2022	Total Trips	30,600	3,600	25,700	86,800	40,700	187,400
	% of Corridor	16%	2%	14%	46%	22%	100%
	PT Trips	2,600	<100	1,000	3,500	500	7,600
	PT Share	8%	<1%	4%	4%	1%	4%
Change	Total Trips	+31%	+12%	-	+7%	+18%	+12%
	PT Trips	+13%	-	-16%	+3%	+25%	+4%

While only four per cent of the total corridor trips are made by public transport, a higher proportion of end to end trips are made by public transport (eight per cent). Public transport trips into Aberdeen from the corridor account for just under 50 per cent of total corridor public transport trips using both the commuter rail service and the available bus services. The public transport trips are forecast to increase by 2022 by four per cent, against a rise in total trips of 12 per cent, indicating increased use of cars for trips⁴¹⁶.

ATC data from the SRTDb gives a figure of approximately eighteen per cent HGV traffic on the A90 at Stonehaven⁴¹⁷. This route experiences a high percentage of HGV traffic and as such is important for freight.

⁴¹⁵ Network Rail: Scotland Rail Utilisation Strategy March 2007

⁴¹⁶ TMfS:05

⁴¹⁷ SRTDb

The AADT flow on the A90 Trunk Road varies from 15,000 vehicles on the Brechin Bypass in the centre of the corridor, to over 31,000 vehicles approaching Dundee and 34,000 vehicles approaching Aberdeen⁴¹⁸. These levels reflect the high level of commuting trips from the corridor which use the A90 Trunk Road to access Dundee and Aberdeen, but are within the theoretical design capacity for this road type⁴¹⁹.

The railway stations in this corridor have a total throughput of some 1.13 million passengers per annum (2005), with Arbroath and Stonehaven the busiest stations⁴²⁰.

In 2005 Aberdeen Airport had a throughput of around 2.9 million passengers and 4,100 tonnes of freight per year⁴²¹. This makes Aberdeen the third busiest airport in Scotland. Dundee Airport was used by 48,600 passengers in 2006⁴²².

Montrose's port handles 0.7 million tonnes of freight per annum while Dundee's port handles over 1.2 million compared to Aberdeen port's handling of over 5 million tonnes of freight⁴²³. Aberdeen port also handles ferry services to and from Shetland and Orkney, with 140,000 passengers and 22,700 vehicles in 2005⁴²⁴. While most freight from Aberdeen moves by road, all freight from the ports at Dundee and Montrose do so as there are no rail links.

⁴¹⁸ Transport Scotland, SRTDb

⁴¹⁹ Design Manual for Roads and Bridges: TA46/97

⁴²⁰ Rail industry LENNON data (Station Usage 2004/2005)

⁴²¹ STS No. 25 (2006), Table 9.6, 9.13

⁴²² STS No. 25 (2006), Table 9.6

⁴²³ STS No. 25 (2006), Table 10.6, 10.3

⁴²⁴ STS No. 25 (2006), Table 10.15

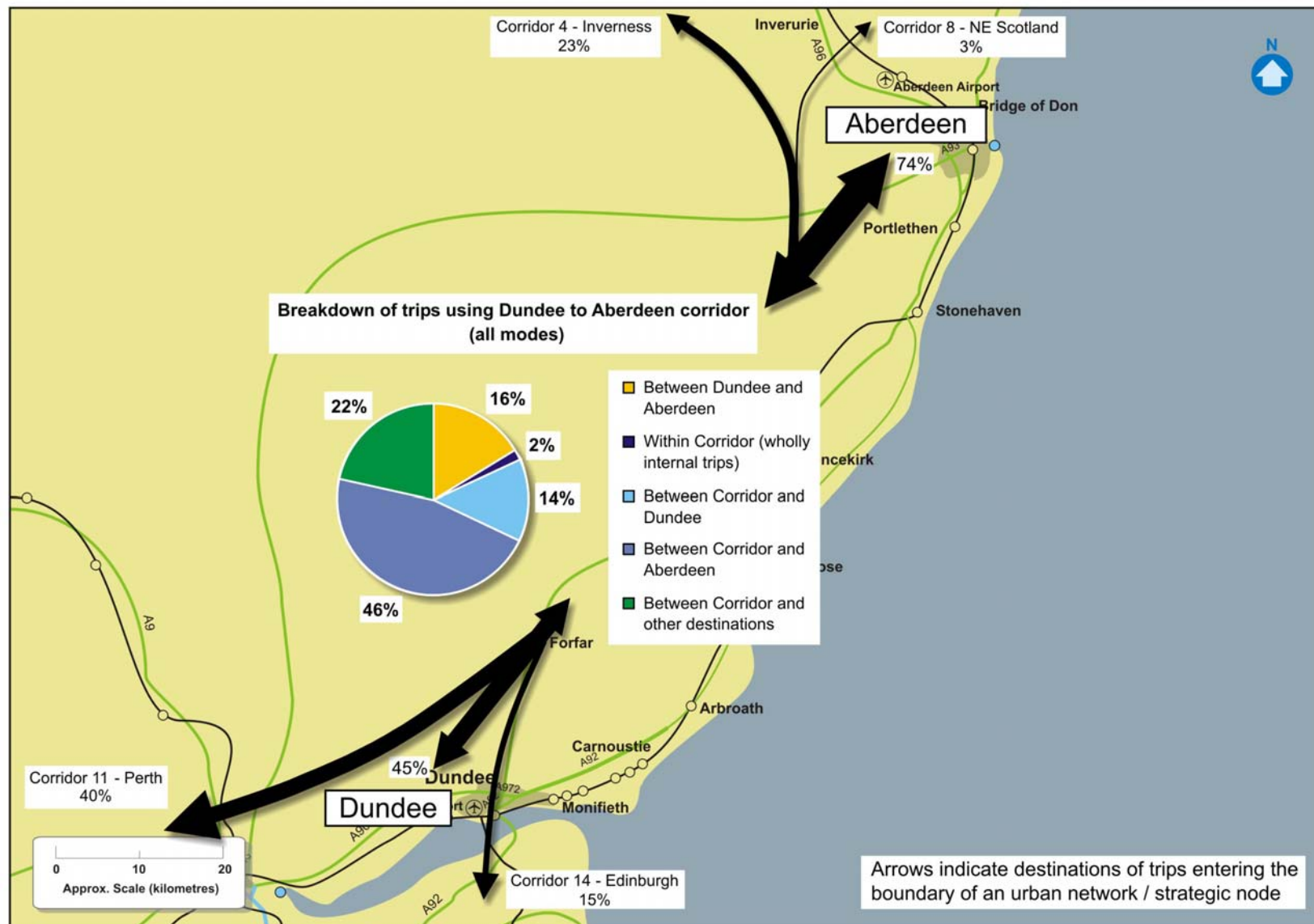


Figure 7.5.4 Travel Patterns 2022, Corridor 5 – Dundee to Aberdeen

7.5.4 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 road within the corridor is the A90 Trunk Road which is dual carriageway throughout, with a mixture of grade separated and at-grade junctions. Figure 7.5.5 shows the current and forecast average speed on the A90 Trunk Road between Dundee and Aberdeen within the corridor. A typical city centre to city centre journey time is also shown.

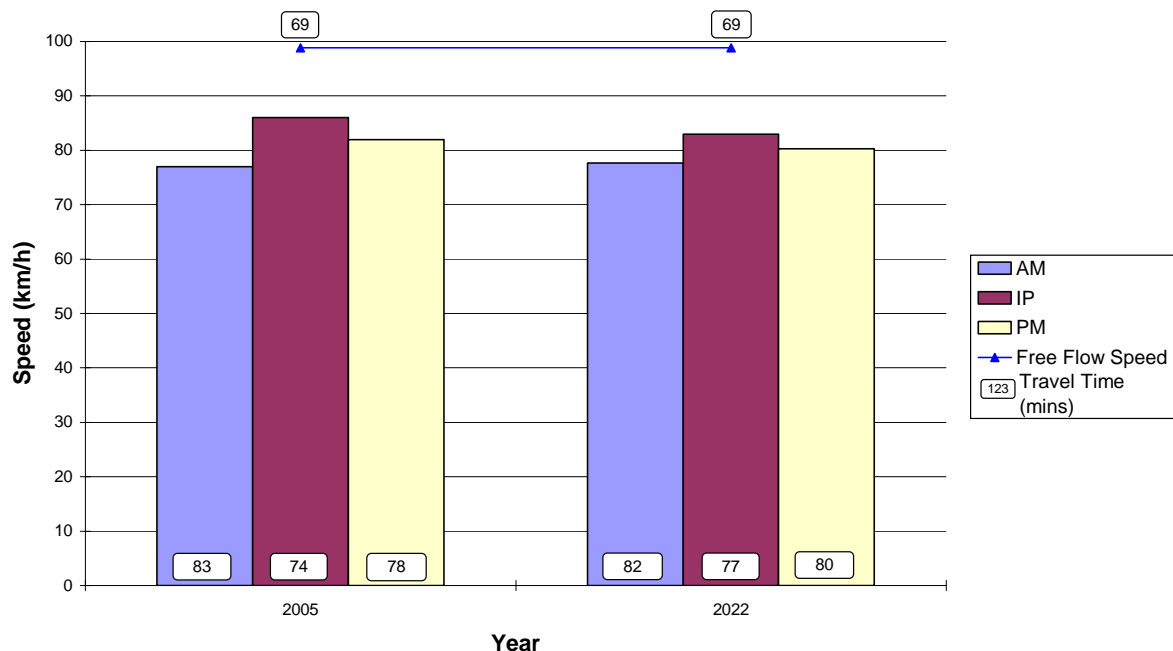


Figure 7.5.5: Average Road Speeds (Corridor 5)⁴²⁵

Travel time in 2005 ranges from 1 hour 14 minutes in the off peak to 1 hour 23 minutes in the morning peak. This is in contrast to the free flow travel time of 1 hour 9 minutes. By 2022 the travel times are largely unchanged, ranging from 1 hour 17 minutes in the off peak to 1 hour 22 minutes in the morning peak. The free flow travel time remains unchanged at 1 hour 9 minutes.

⁴²⁵ TMfS:05

The average speeds in the morning, inter-peak and evening periods are forecast to remain fairly constant between 2005 and 2022. The opening of the Aberdeen Western Peripheral Route is expected to alleviate congestion on the approach to Aberdeen, resulting in a slight increase in average speed by 2012. However, by 2022 average speeds are forecast to return to around 2005 levels.

At present strategic traffic on the A90 Trunk Road travels along the Aberdeen outer distributor (Anderson Drive) to reach destinations to the north and west or uses the existing B979 Netherley Road / Malcolm Road to bypass Aberdeen to the west. The opening of Aberdeen Western Peripheral Route, scheduled for completion in 2013, will provide considerable benefits for strategic traffic which is travelling beyond Aberdeen, in terms of both reduced journey time and reliability. The removal of this strategic traffic leads to a reduction in congestion on the approaches to Aberdeen, which potentially makes car travel from the corridor more attractive. However, a number of other measures included in the Modern Transport System of which Aberdeen Western Peripheral Route is only one part, are specifically designed to encourage public transport use so that the benefits associated with the Aberdeen Western Peripheral Route are not eroded through increased car usage.

Similarly, strategic traffic with destinations in central Scotland and beyond uses the outer distributor through Dundee. While over its length the road network in this corridor is operating effectively and reliably, within its theoretical design capacity, there is peak period congestion on the city outskirts of both Dundee and Aberdeen where the corridor road intersects the urban network. This results in journey times being approximately 20 – 30 per cent or 15 – 20 minutes longer than the daily average⁴²⁶. This is likely to remain an issue other than for strategic traffic which will make use of Aberdeen Western Peripheral Route.

Figure 7.5.6⁴²⁷ provides a comparison of journey time by mode from Dundee to Aberdeen within the morning peak.

Travel by train from Dundee to Aberdeen is comparable to car, although the level of competitiveness varies slightly along the corridor. Short journeys to the commuting areas of Portlethen are marginally faster by train, however by Brechin the journey time by train is similar to car. The longer journey between Dundee and Aberdeen is marginally slower by train, however the train still offers a good alternative to car. Journey time by bus is considerable slower than both other modes throughout the corridor. This is primarily due to the slower running speed and number of stops along the route.

⁴²⁶ <http://scottishexecutive.itisholdings.com/>

⁴²⁷ Journey times for bus/rail include a 20 minute walk/wait time

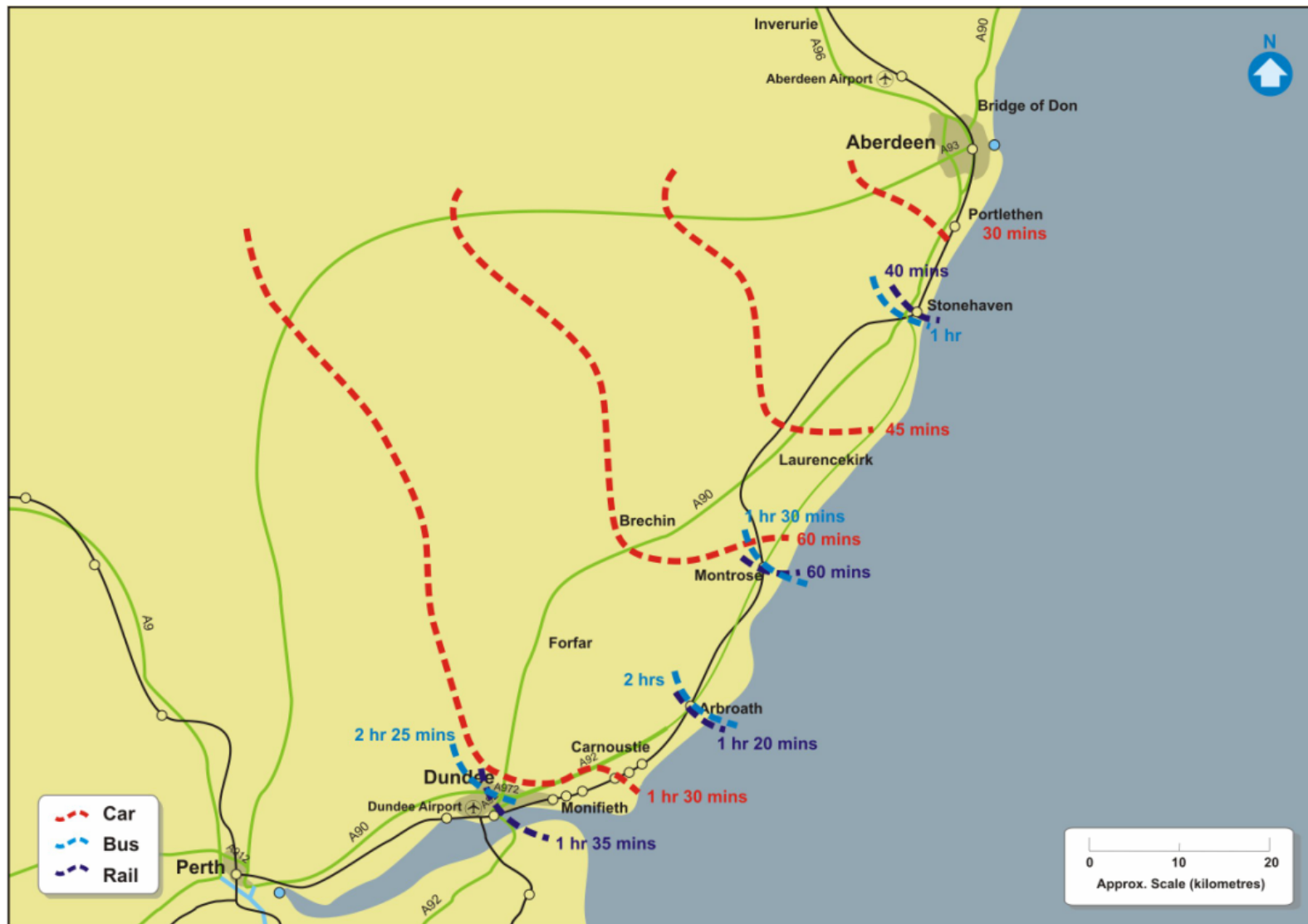


Figure 7.5.6: Journey Time to Aberdeen City Centre by Road/Rail (2005 AM peak), Corridor 5 - Dundee to Aberdeen

Emissions (CO₂ only)

This section of the report addresses the issue:

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

CO₂ per person kilometre is forecast to rise from 144 tonnes / million person kilometres to 183 tonnes / million person kilometres between 2005 and 2022 in this corridor. This is a result of CO₂ emissions rising at a slightly greater rate than person kilometres between 2005 and 2022⁴²⁸.

The road based transport network produced 224,500 tonnes of CO₂ in Corridor 5 in 2005. This equates to around three per cent of the total road based transport related CO₂ emissions in Scotland. By 2022, it is forecast that CO₂ emissions in Corridor 5 will rise to around 324,500 tonnes, approximately four per cent of Scotland's road based transport related CO₂ emissions in 2022.

The rail network produced 10,000 tonnes of CO₂ in Corridor 5 in 2007. This equates to approximately 12 per cent of the total rail based CO₂ emissions in Scotland⁴²⁹.

Therefore, it is estimated that the road and rail based transport network collectively produced 234,500 tonnes of CO₂ in Corridor 5 in 2005. This equates to approximately four per cent of the total road and rail based transport related CO₂ 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?

Road based public transport is not very competitive with car in this corridor, with journey times almost one hour longer. However, rail based public transport is of similar journey time to that of car travel. Public transport accessibility along the coast is significantly higher than for inland areas such as Forfar and Brechin. Both public transport and car accessibility is predicted to improve in future years. The Aberdeen Western Peripheral Route, a new rail station at Laurencekirk, and Park-&-Ride at Stonehaven means there will be little change in the overall balance between public transport and car accessibility.

The infrastructure and service provision provide for effective business interaction between and the centres of this corridor, with commuting opportunities by public transport and private car allowing suitable return journeys to be made within a working day.

⁴²⁸ TMfS:05

⁴²⁹ AEA (2001) Rail Emission Model Final Report; www.nationalrail.co.uk; and www.networkrail.co.uk

Table 7.5.2, provides an assessment of the quality of strategic bus services within the corridor on a scale of one to five, with one being 'poor' and five being 'excellent'.

Table 7.5.2: Assessment of Bus Service Quality⁴³⁰

Service Numbers	Annual Journeys	Reliability	Frequency	Simplicity	Value	Coverage	Vehicle Quality
39, 40, 117, M9, X7	24,021	4	3	4	3	3	4

In recent years, a number of speed cameras have been installed on the A90 in a bid to address previous concerns over speeding and accidents. This has proven to be successful and the recent accident and fatal accident rates on the A90 between Dundee and Aberdeen are both lower than the national rate for non built up A Class trunk roads. Initial analysis of severe accident clusters indicated road safety issues near Laurencekirk and Portlethen. The proportion of severe accidents in this corridor (31 per cent) is significantly greater than the national average (25 per cent)⁴³¹.

As might be expected in a largely rural community, there are no particular fears of using public transport in the evening. For bus travellers, only two per cent of females consider bus travel in the evenings in Aberdeenshire to be 'not safe at all'. For train travellers, this figure is less for females but higher for males, with four per cent of males considering train travel to be 'not safe at all'. In Angus, this figure is about 10 per cent for both males and females⁴³².

Summary of Infrastructure and Operational Constraints

Key constraints and congestion points are shown in Figure 7.5.7, including:

- Car parking at Arbroath, Montrose and Stonehaven railway stations is at capacity;
- Poor rail service at intermediate stops between Dundee and Montrose;
- Long signalling sections and no southbound loops restrict capacity on the railway network;
- Lack of headway and freight loops;
- Single line section south of Montrose creates a bottleneck on the railway; and
- Overcrowding on rail services is forecast in the future between Stonehaven and Aberdeen.

⁴³⁰ Bus Users UK (Qualitative Assessment – 1: very poor; 5: excellent)

⁴³¹ Transport Scotland SERIS Database

⁴³² Scottish Household Survey 2003/2004 Perceptions of safety from crime during evening bus/rail travel

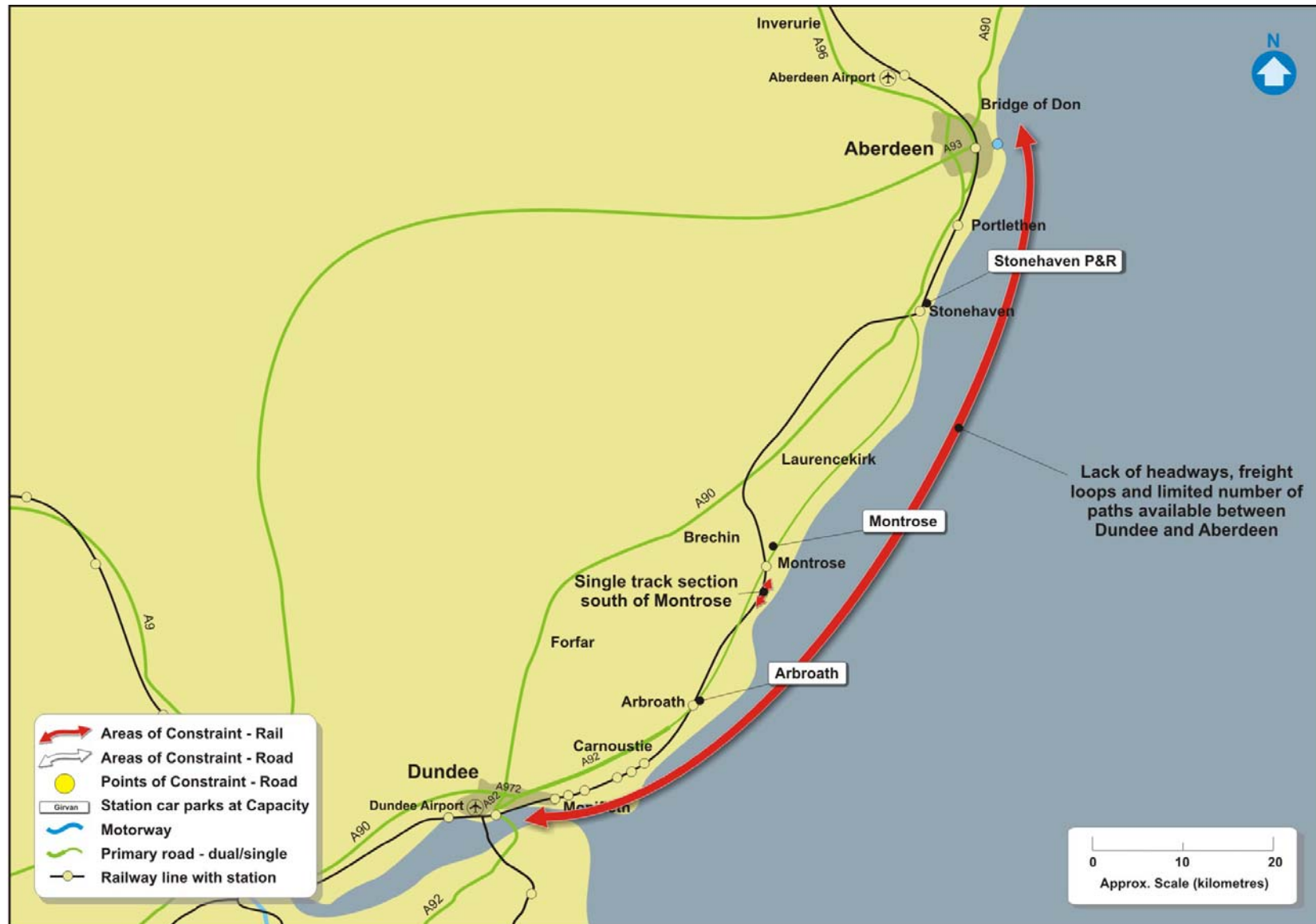


Figure 7.5.7: Areas of Constraint on the Network, Corridor 5 - Dundee to Aberdeen

7.5.5 Summary and Conclusion

Overall, how well does the transport network perform?

This corridor performs relatively well with only isolated problems of congestion experienced on the road and rail network. Overall the trunk road network in the corridor operates within capacity and vehicle speed is high and will remain so in the future. The approaches to Dundee and Aberdeen suffer from congestion and journey time reliability issues, particularly during the peak periods. This is mainly as a result of significant levels of traffic commuting from within the corridor to both cities.

The single track section of railway at Usan, near Montrose, impacts on the operation of the rail network. Despite this, journey time by train is competitive with car.

The significant proportion of the demand on this corridor involves trips travelling the whole length. Journey times by rail between the two cities vary depending on the nature of the service (local or express) which impacts on the overall competitiveness of public transport in the corridor.

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

Demand on this corridor is forecast to increase but at a rate lower than that forecast in many other parts of Scotland. Coupled with the construction of the Aberdeen Western Peripheral Route, the northern sections of the corridor are not expected to suffer from significant levels of congestion. Stonehaven Park-&-Ride and a new station at Laurencekirk will improve public transport accessibility.

Congestion at the southern end of the A90 is forecast to increase as the longer distance traffic interacts with the local traffic, placing increased pressure on the road and rail network within Dundee.

Although outside this corridor, 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. However, overcrowding on services approaching Aberdeen is forecasted. This will influence mode choice for commuters to Aberdeen.

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

With a significant change in population forecast over the next 15 years, the challenge will therefore be to maintain an efficient network.

What are the key problems associated with delivering the KSOs?

Balancing the competing pressures of local and strategic trips on the rail network will lead to potential conflicts of reducing journey time and improving accessibility to the local communities. Maintaining rail competitiveness with road, given programmed improvements to the road network will be an issue.