

7.11 Corridor 11: Perth to Dundee

7.11.1 Setting the Context

Corridor 11 is the area between Perth and Dundee, bounded to the south by the Firth of Tay and to the north by the Sidlaw Hills, as shown in Figure 7.11.1. The corridor is approximately 35 kilometres in length and includes part of the council areas of Perth and Kinross, Angus and Dundee City. The population of the corridor between Perth and Dundee is 17,500⁵⁶⁹ with only a few settlements located adjacent to the road and rail network. The main role of the corridor is to provide a link between the population centres of Perth and Dundee and also between the northeast of Scotland and the Central Belt. The corridor supports 6,200 people in employment⁵⁶⁹.

Figure 7.11.2 shows the expected areas of change in population and employment between 2005 and 2022. The population is projected to decrease by approximately 1,900 (13 per cent) by 2022. A small increase in the number of households within the corridor of two per cent is forecast between 2005 and 2022. Employment within the corridor is expected to increase by 1,100 jobs (15 per cent) between 2005 and 2022⁵⁶⁹. The economic inactivity rate within the corridor was around 16 per cent in 2005 which was lower than the national average of 21 per cent. This is expected to half between 2005 and 2022⁵⁶⁹. Although some of the percentage increases are significant, the absolute levels of increase are relatively small and are not therefore likely to have a major impact on travel patterns in the corridor.

The median gross weekly earnings for the local authority areas within the corridor are lower than the national average of £412⁵⁷⁰. Median gross weekly earnings for the three council areas are:

- Perth and Kinross: £388; and
- Angus: £390;

The national average for car ownership, measured as a percentage of households with access to a car, is 67 per cent. Within the corridor, car ownership, with the exception of Dundee City, is above average reflecting the rural nature and high levels of dependency of the private car. The car ownership levels for the areas served by the corridor are as follows:

- Perth and Kinross: 76 per cent;
- Angus: 74 per cent; and
- Dundee City: 55 per cent⁵⁷¹.

⁵⁶⁹ TELMoS

⁵⁷⁰ Scottish Economic Statistics 2006, table 4.20

⁵⁷¹ Scotland's Census 2001: www.scrol.gov.uk Table KS17 – these refer to the whole Council areas

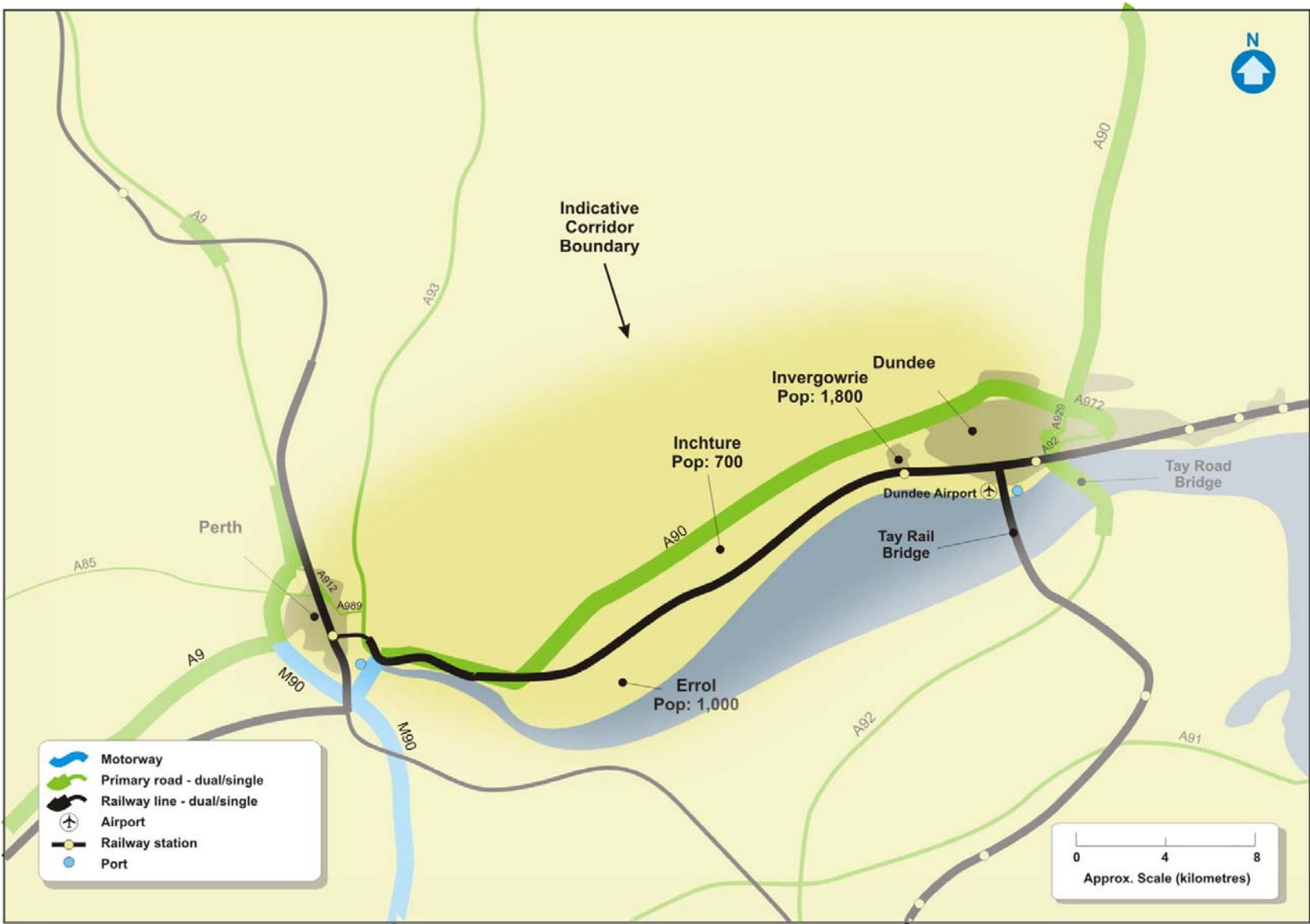


Figure 7.11.1: Setting the Context, Corridor 11 - Perth to Dundee

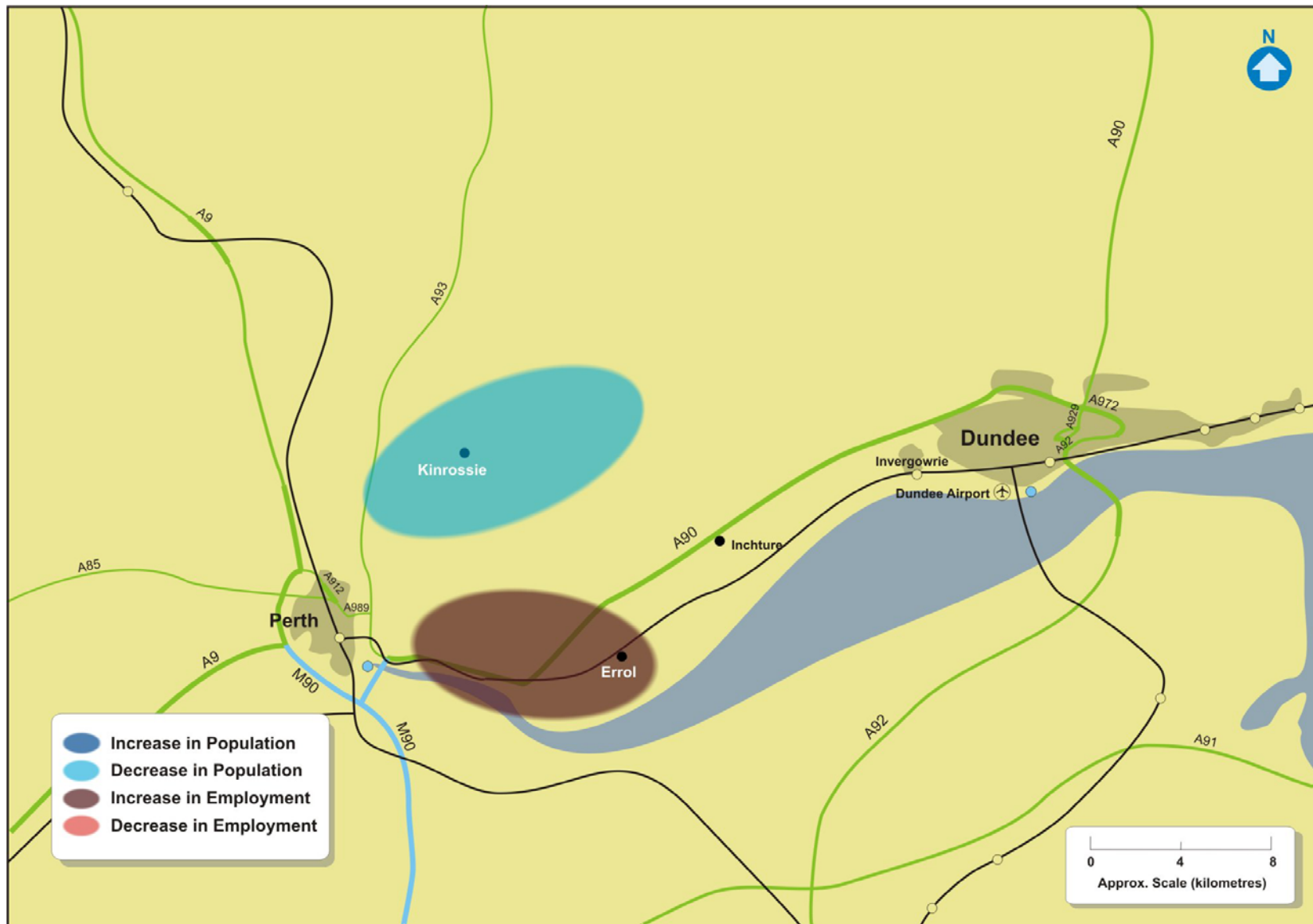


Figure 7.11.2: Changes in Population and Employment, 2005 & 2022, Corridor 11 - Perth to Dundee

7.11.2 Transport Network and Operations

Infrastructure and Services

The principal elements of the transport network that play a national strategic role are shown in Figure 7.11.1.

The A90 Trunk Road is the main spine road. It is a dual carriageway linking the A85 and Kingsway on the outskirts of Dundee with the M90 to the west of Perth. It provides a link for trips from Central Scotland to the northeast, trips between the main population centres in Perth and Dundee and local trips within the corridor. The junctions along this route have recently been upgraded to grade-separated standard. These improvements provide a consistent level of provision along its length and address previous safety concerns at a number of the junctions.

The dual track rail line between Perth and Dundee serves the two cities and provides links to the northeast of Scotland from the Central Belt. However it does not provide for local trips; the only station in the corridor is at Invergowrie, immediately west of Dundee.

Service patterns are generally:

- One train per hour between Perth and Dundee (Glasgow to Aberdeen service)

Frequent bus services also operate between Perth and Dundee. Services are provided by Citylink / Megabus (a joint service) and Stagecoach. Citylink service M8 operates between Glasgow-Stirling-Perth-Dundee along the A90. The Citylink / Megabus service M9 operates between Glasgow-Perth (Broxden)-Dundee-Aberdeen along the A90. Stagecoach service 16 operates between Perth and Dundee following the A90 via Errol and Grange. Stagecoach service 54 operates between Perth and Dundee following the A90 with some journeys via Errol. Stagecoach service 54A operates between Perth and Dundee also following the A90.

Service patterns are generally:

- Two services per hour between Glasgow and Dundee (Citylink);
- One service per hour between Glasgow and Aberdeen (Citylink / Megabus); and
- One service per hour between Perth and Dundee (Stagecoach).

Dundee Airport is situated in the south of the city off the A85 Riverside Drive, and is within a relatively short distance of the eastern edge of this corridor. Further details on the impact of the airport on transport movements in the area are outlined in the text covering the Dundee Urban Network (Chapter 5.2).

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

Asset Management

In 2007, 30 per cent of the trunk road network pavement⁵⁷² 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 cent⁵⁷³. Under Transport Scotland's planned maintenance schedule, the net figure for the corridor is expected to fall to 18 per cent by 2012.

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

Demand Management

There are no demand management measures within the corridor. However, parking control, charging, and bus priority details are discussed within the Dundee Urban Network (Chapter 5.2) and Perth Strategic Node (Chapter 6.2).

Programmed Schemes

There are no programmed road or rail schemes that are expected to significantly change the performance of this corridor.

7.11.3 Travel Patterns

Travel patterns in the corridor are presented in Figure 7.11.3. In 2005, there were approximately 78,000 trips in the corridor in an average 12-hour day. Of these, 5,500 (seven per cent) were public transport trips. It is forecast that by 2022 the total trips will increase to approximately 95,100 per day and public transport trips will increase to approximately 5,700. Compared to 2005 this is a 22 per cent increase in total trips, with an overall four per cent increase in public transport trips, however public transport mode share is decreasing. Table 7.11.1 summarises travel demand and public transport share within the corridor.

⁵⁷² Transport Scotland SERIS Database

⁵⁷³ STS No. 25 (2006) Table 5.5

Table 7.11.1: Summary of Demand (12 Hour) and Public Transport Share⁵⁷⁴

		Between Perth and Dundee	Within Corridor	Between Corridor and Perth	Between Corridor and Dundee	Between Corridor and other destinations	Total Trips
2005	Total Trips	51,900	800	500	7,000	17,800	78,000
	% of Corridor	66%	1%	1%	9%	23%	100%
	PT Trips	4,600	<100	200	500	200	5,500
	PT Share	9%	1%	40%	7%	1%	7%
2022	Total Trips	63,000	1,000	1,100	8,500	21,500	95,100
	% of Corridor	66%	1%	1%	9%	23%	100%
	PT Trips	4,900	<100	200	400	200	5,700
	PT Share	8%	1%	18%	5%	1%	6%
Change	Total Trips	+21%	+25%	+120%	+21%	+21%	+22%
	PT Trips	+7%	0%	0%	-20%	0%	+4%

By far the largest component is travel between Perth and Dundee, which includes traffic travelling through Perth and Dundee to / from the Central Belt and the north of Scotland. For example almost 60 per cent of the traffic heading west on the corridor has a destination beyond Perth. This highlights the role this corridor plays as a through link in the strategic road network.

A small proportion of travel is within the corridor, which reflects the low population levels and rural nature of the corridor. The increase in trips between the corridor and Perth and Dundee between 2005 and 2022 can be attributed to the decrease in population and increase in employment within the corridor resulting in more trips accessing the corridor from the population centres at either end.

The average daily flow on the A90 on this corridor is approximately 39,000 vehicles per day⁵⁷⁵. This is forecast to increase by approximately 20 per cent over the period to 2022, which is in line with national projections.

The only station on the corridor (Invergowrie) handles approximately 1,500 passengers per year, compared to approximately 1,500,000 and 700,000 at Dundee and Perth stations, respectively. However, Invergowrie is only served by three northbound and two southbound trains per day. There are an estimated one million annual passenger journeys by bus on this corridor, the vast majority of which travel from end to end.

ATC data from the SRTDb gives a figure of approximately fifteen per cent HGV traffic on the A90 at Longforgan⁵⁷⁶.

⁵⁷⁴ TMfS:05

⁵⁷⁵ Transport Scotland: Scottish Roads Traffic Database

⁵⁷⁶ SRTDb

There is a limited rail freight service in this corridor, principally cement and mixed goods that are destined for Aberdeen from the Central Belt. There are no rail freight terminals within the corridor.

The main railway station within this corridor is Invergowrie station with a total throughput of some 1,365 passengers per annum (2005) ⁵⁷⁷.

⁵⁷⁷ Rail industry LENNON data (Station Usage 2004/2005)

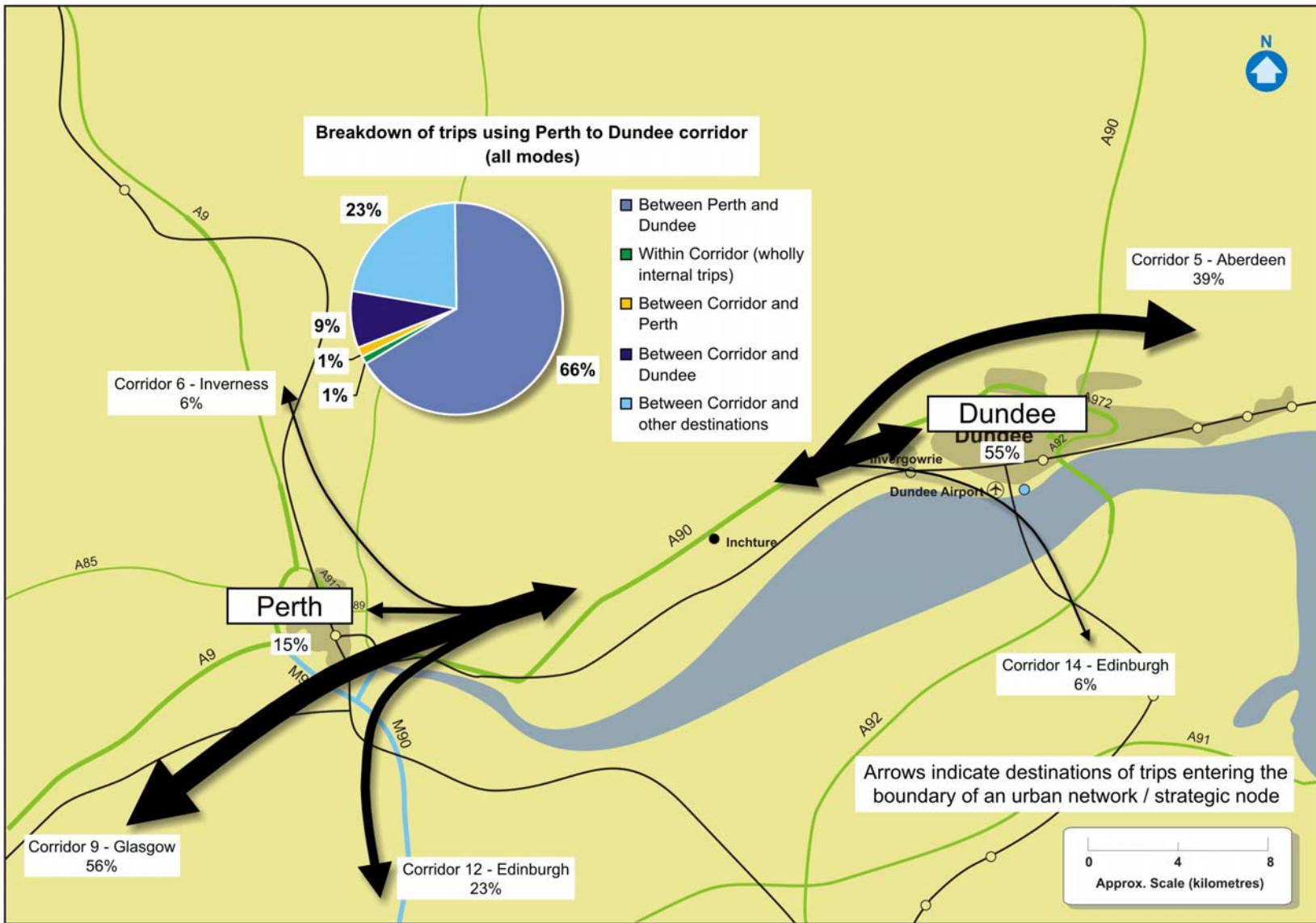


Figure 7.11.3 Travel Patterns 2022, Corridor 11 – Perth to Dundee

7.11.4 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?

Figure 7.11.4 shows the modelled average speeds across the morning, evening and inter-peak periods on the A90 in the corridor, compared with the free flow speeds, for the years 2005 and 2022. The travel time for an end-to-end trip is also shown.

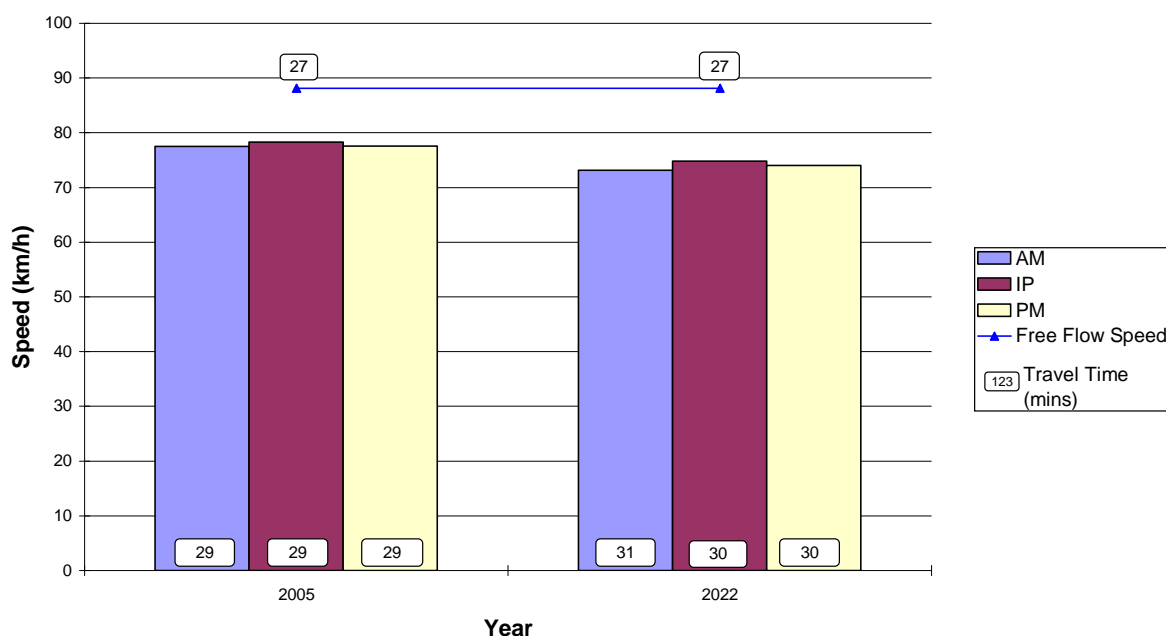


Figure 7.11.4: Average Road Speeds (Corridor 11)⁵⁷⁸

Travel time in 2005 is consistent across all time periods at 29 minutes, which compares favourably to the free flow travel time of 27 minutes. By 2022 travel time increases to 30 minutes in the off peak and evening peak, and to 31 minutes in the morning peak. Free flow travel time remains consistent at 27 minutes during this same timeframe.

The average speeds are reasonable for a grade-separated dual carriageway road. Average speeds are expected to remain relatively unchanged across all time periods to 2022.

⁵⁷⁸ TMfS:05

There is some peak congestion on the western edge of Dundee at the Swallow Hotel roundabout (A90 / A85 junction) where through and local traffic compete for capacity. In addition, approximately 4 per cent of journeys from the A90 Inchtute to Forfar Road junction have journey time reliability issues especially when approaching Dundee⁵⁷⁹. This means journey times are as much as 70 per cent or 20 minutes longer than the daily average⁵⁸⁰. As shown above, the levels of delay at this junction are forecast to increase journey times along the route by approximately five per cent.

Figure 7.11.5⁵⁸¹ illustrates the travel time isochrones for trips to Dundee. Rail journey times are broadly similar to those of car journeys, even allowing for access time at each end of the journey.

Rail service reliability is measured as the percentage of trains actually run in the last 12 months, split into seven service groups. The reliability of the services relating to this corridor is:

- First ScotRail Express 94.2 per cent (target 92 per cent)⁵⁸².

⁵⁷⁹ Congestion on Scottish Trunk Roads, 2003 and 2004, Transport Scotland

⁵⁸⁰ <http://scottishexecutive.itisholdings.com/>

⁵⁸¹ Journey times for bus/rail include a 20 minute walk/wait time

⁵⁸² <http://www.firstgroup.com/scotrail/content/aboutus/ourperformance.php>

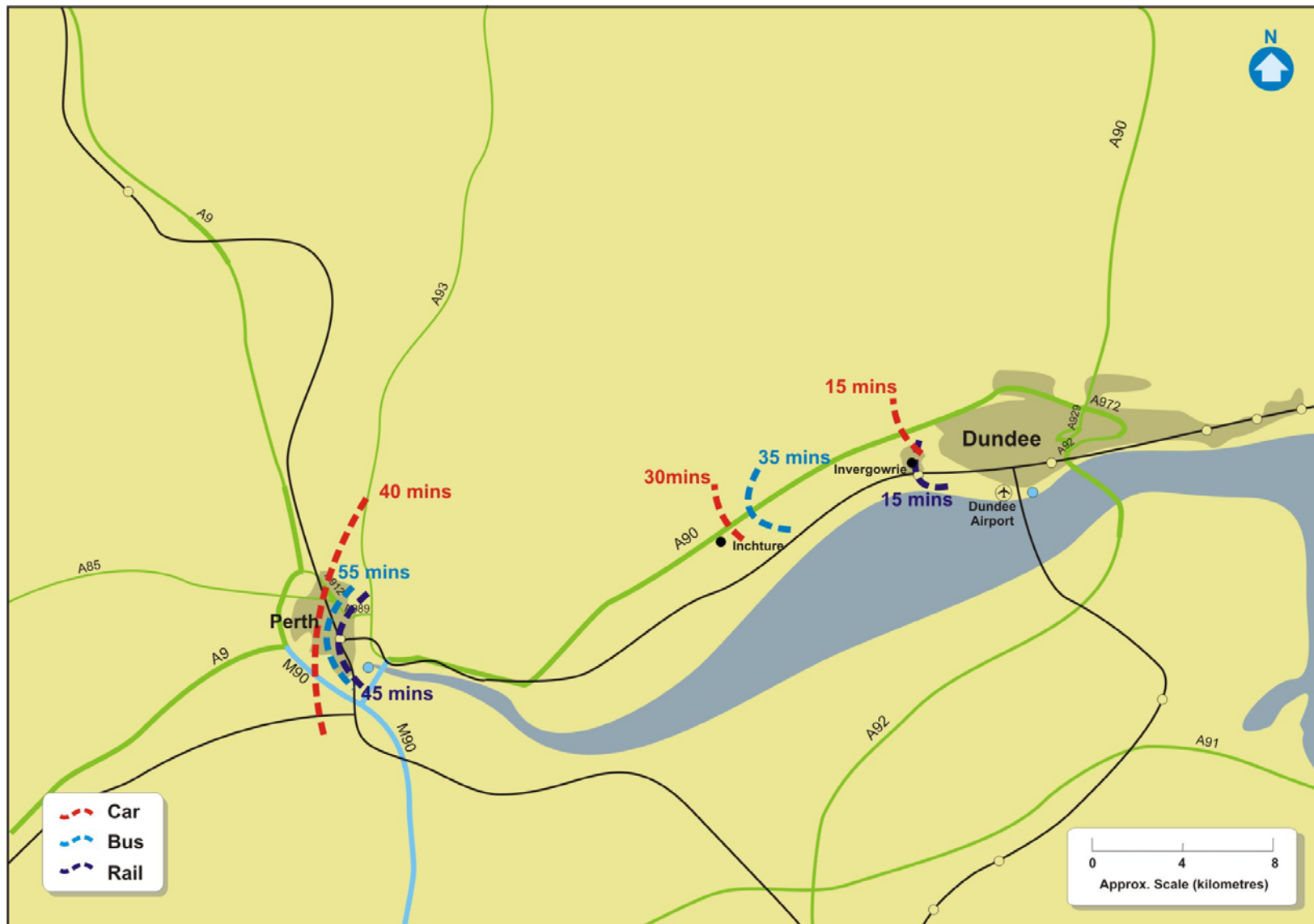


Figure 7.11.5: Journey Time to Dundee City Centre by Road/Rail (2005 AM peak), Corridor 11 - Perth to Dundee

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 kilometres are forecast to rise from 125 tonnes / million person kilometres to 142 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 2022⁵⁸³. Various factors such as increasing distances travelled by HGVs in 2022 in the corridor can be used to explain such trends.

The road based transport network produced 83,500 tonnes of CO₂ in Corridor 11 in 2005. This equates to approximately one per cent of the total transport related CO₂ emissions in Scotland.

By 2022, it is forecast that CO₂ emissions in Corridor 11 will rise to around 109,500 tonnes, remaining around one per cent of Scotland's road based transport related CO₂ emissions in 2022.

The rail network produced 1,500 tonnes of CO₂ in Corridor 11 in 2007. This equates to approximately two per cent of the total rail based CO₂ emissions in Scotland.

Therefore, it is estimated that the road and rail based transport network collectively produced 85,000 tonnes of CO₂ in Corridor 11 in 2005. This equates to approximately one per cent of the total road and rail based transport related CO₂ emissions in Scotland⁵⁸⁴.

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?

Travel patterns on this particular corridor consist mainly of trips travelling from one end to the other. This is not surprising given the short nature of this corridor and its position with the strategic transport network. Public transport serves this end to end demand well through a combination of local and strategic services. However, in the rural areas, public transport accessibility is very low and uncompetitive with car.

⁵⁸³ TMfS:05

⁵⁸⁴ AEA (2001) Rail Emission Model Final Report; www.nationalrail.co.uk; www.networkrail.co.uk

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

In terms of journey times, public transport is generally competitive with car in this corridor, although the frequency of service impacts on the overall competitiveness. This situation is forecast to continue into the future with little change.

Table 7.11.2 provides an assessment of the quality of bus services in the corridor on a scale of one to five, with one being 'poor' and five being 'excellent', including commuter services from Perth to Dundee. All attributes are either average or good.

Table 7.11.2: Assessment of Bus Service Quality⁵⁸⁵

Service Numbers	Annual Journeys	Reliability	Frequency	Simplicity	Value	Coverage	Vehicle Quality
16, 54, 54A, 54B, 57 (Stagecoach)	40,300	4	4	3	3	4	4
M8, M9 (Citylink/Megabus)							

The limited availability of rail journeys within the corridor limit the use of the *PLUSBUS* integrated ticket, which is available for rail journeys to Perth and Dundee and unlimited bus travel within the destination.

The accident and fatal accident rates on the A90 between Perth and Dundee are both lower than the national rate for non built up A Class trunk roads. This route has recently been upgraded to a fully grade-separated route, which included the removal of gaps in the central reservation, thus preventing dangerous manoeuvres and reducing the accident risk⁵⁸⁶.

Perceptions of personal security do not appear to pose barriers to public transport use. Surveys show that there are lower than average safety and security fears for public transport users in the corridor⁵⁸⁷.

⁵⁸⁵ Bus Users UK (Qualitative Assessment – 1: very poor; 5: excellent)

⁵⁸⁶ Transport Scotland SERIS Database

⁵⁸⁷ Scottish Household Survey 2003/2004: Perceptions of safety from crime during evening bus/rail travel

Summary of Infrastructure and Operational Constraints

In general the road and rail networks within the corridor perform well, with the only point of congestion occurring at the Swallow Hotel Roundabout (A90 / A85) junction on the outskirts of Dundee. On rail there is a mix of express passenger services with a mix of slower services calling at Invergowrie. Increased usage is predicted at all stations. Perth station is at capacity as is Perth station car park. There are restricted maintenance opportunities at Perth due to the overnight stabling of rolling stock. Corridor constraints are shown in Figure 7.11.6.

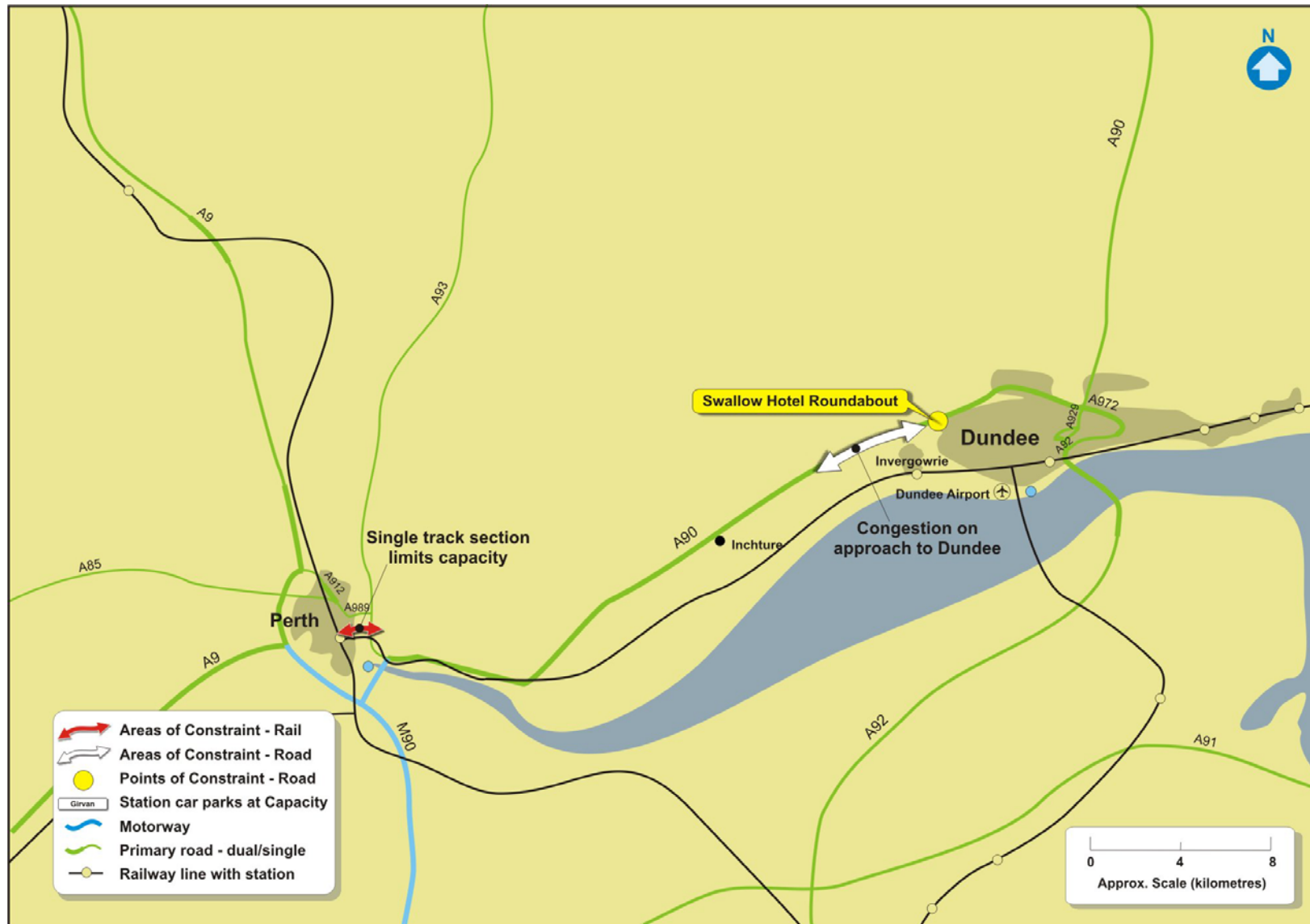


Figure 7.11.6: Areas of Constraint on the Network, Corridor 11 - Perth to Dundee

7.11.5 Summary and Conclusions

Overall, how well does the transport network perform?

There has been significant investment made in this corridor aimed at improving safety through the grade separation of junctions and the closure of centre reserve crossing points. As a result the road network provides a good level of service although there are some peak congestion issues at the Swallow Hotel Roundabout and also some journey time reliability issues. Bus services between Perth and Dundee are impacted by the delay at the Swallow Hotel Roundabout. Traffic at the junction is subject to delays during the morning and evening peak periods.

The rail network is also operating within capacity in the corridor with journey times being broadly comparable with road.

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

The level of growth in demand forecast for this corridor is similar to the national projections. As a result the levels of congestion at the junction with the Kingsway are expected to increase slightly during the peak periods. The road network is expected to continue to offer a good level of service, with strategic journey times on the main route, the A90, increasing marginally between 2005 and 2022. Average speeds throughout the day are expected to remain fairly constant as a result. Average travel times are expected to remain fairly constant resulting in minimal journey time variability.

The rail network is expected to continue to offer a competitive mode of travel against the car and the short term aspiration to reduce journey times from Dundee and Perth to Glasgow and Edinburgh through revised stopping patterns will facilitate this.

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

The reduction in population coupled with an increase in the number of households indicates some degree of population dispersal, which may mean that providing effective access to public transport services becomes more difficult.

What are the key problems associated with delivering the KSOs?

The likely increase in population dispersal makes providing effective access to public transport more difficult. As a result there will be continued reliance on car based travel with consequential adverse impacts on emissions.