

5.3 Edinburgh

5.3.1 Setting the Context



Edinburgh is Scotland's capital city and plays a vital role in contributing to the economic well-being of the country. The city has a population of approximately 436,000¹⁹⁰, and the SEStran area¹⁹¹, which largely correlates with the functioning of the Edinburgh labour market, has a population of approximately 1.5 million¹⁹².

The city's economy, which has been growing steadily in recent years, is dominated by the service sector with a strongly performing financial services sector and a significant number of public service employees. This growth has resulted in rising land and property prices and demand for further development in and around the city. Average house prices more than doubled between 1998 and 2006¹⁹³. One of the consequences of this is the increase in the number of those working in Edinburgh but residing outside the city, increasing the levels of demand on radial routes into the city. Putting this into context, Edinburgh accounts for 45 per cent of the total employment in the SEStran area but only 30 per cent of the population.

Figure 5.3.1 highlights the areas of particular relevance within Edinburgh. This shows the three key areas of economic activity within the city and the principal components of the transport network that support the city region.

¹⁹⁰ General Register Office for Scotland Mid-2004 population estimates for town/city populations: <http://www.gro-scotland.gov.uk/files1/stats/04mid-year-estimates-localities-table3.xls>

¹⁹¹ SEStran includes City of Edinburgh Council, Clackmannanshire, East Lothian, Falkirk Council, Fife, Midlothian, Scottish Borders and West Lothian

¹⁹² General Register Office for Scotland Mid-2006 population estimates for administrative areas: <http://www.gro-scotland.gov.uk/files1/stats/06mype-cahb-t2-revised.xls>

¹⁹³ Edinburgh City Council Capital Review www.capitalreview.co.uk

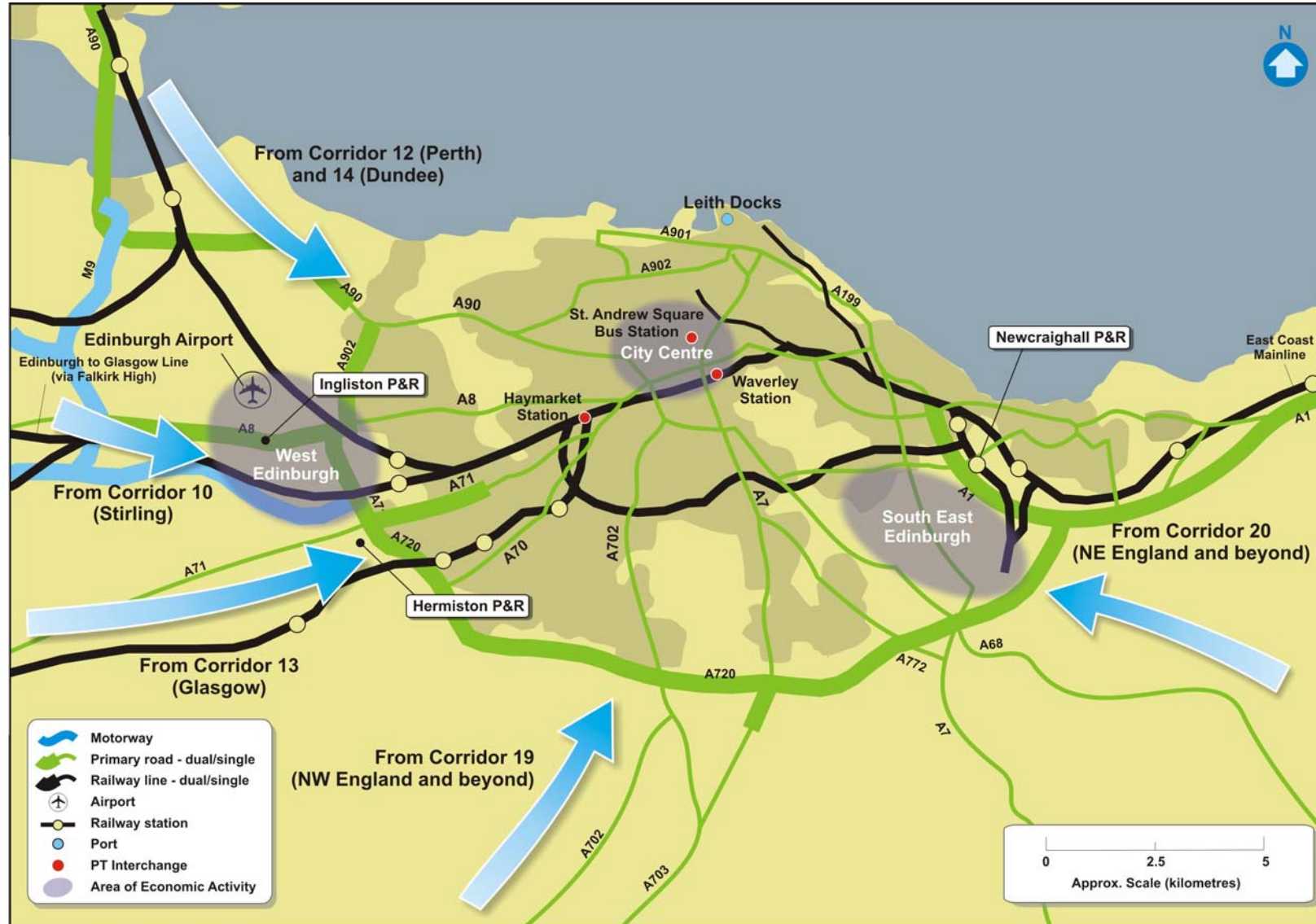


Figure 5.3.1: Edinburgh Urban Network - Setting the Context

Table 5.3.1 below summarises some relevant socio-economic characteristics for Edinburgh and provides a comparison against the regional and national context.

Table 5.3.1: Summary of Socio Economic Characteristics

Indicator	Edinburgh	“Region” (SEStran)	Scotland	UK
Population (2005) ¹⁹⁴	436,000	1,437,000 ¹⁹⁵	5,078,000	60,000,000
Population (2022) ¹⁹⁶	497,000	1,523,000	5,118,000	62,400,000
Population Change (2005 – 2022) ¹⁹⁶	+14%	+ 6%	+1%	+4%
Employment (2005) ¹⁹⁶	298,300	668,100	2,330,900	27,900,000
Employment (2022) ¹⁹⁶	329,400	750,900	2,427,800	29,300,000
GVA per head (2005) ¹⁹⁷	£27,600	£17,390	£15,500	£16,200
Cars / capita (2005) ¹⁹⁸	0.35	0.40	0.39	0.42
Households with Car (2005) ¹⁹⁹	60%	68%	67%	75%

Figure 5.3.2 highlights the areas of particular growth in population and employment in future years within the city and its immediate environs. As the corridors serving Edinburgh are forecast to experience an increase in population in future years, there is expected to be a rising trend in commuting from the wider area to jobs located in Edinburgh. Inactivity rates are projected to decline in Edinburgh from 59,900 in 2005 to 50,700 in 2022¹⁹⁶.

Median gross weekly earnings in Edinburgh are £462, approximately 12 per cent higher than the national average for Scotland (£412)²⁰⁰.

¹⁹⁴ General Register Office for Scotland Mid-2004 population estimates for town/city populations: <http://www.gro-scotland.gov.uk/files1/stats/04mid-year-estimates-localities-table3.xls>

¹⁹⁵ General Register Office for Scotland Mid-2006 population estimates for administrative areas: <http://www.gro-scotland.gov.uk/files1/stats/06mtype-cahb-t2-revised.xls>

¹⁹⁶ TELMoS

¹⁹⁷ Scottish Economic Statistics 2007

¹⁹⁸ STS No.25 (2006)

¹⁹⁹ Scotland's Census 2001 www.scot.nhs.uk Table KS17

²⁰⁰ Scottish Economic Statistics 2006, table 4.20

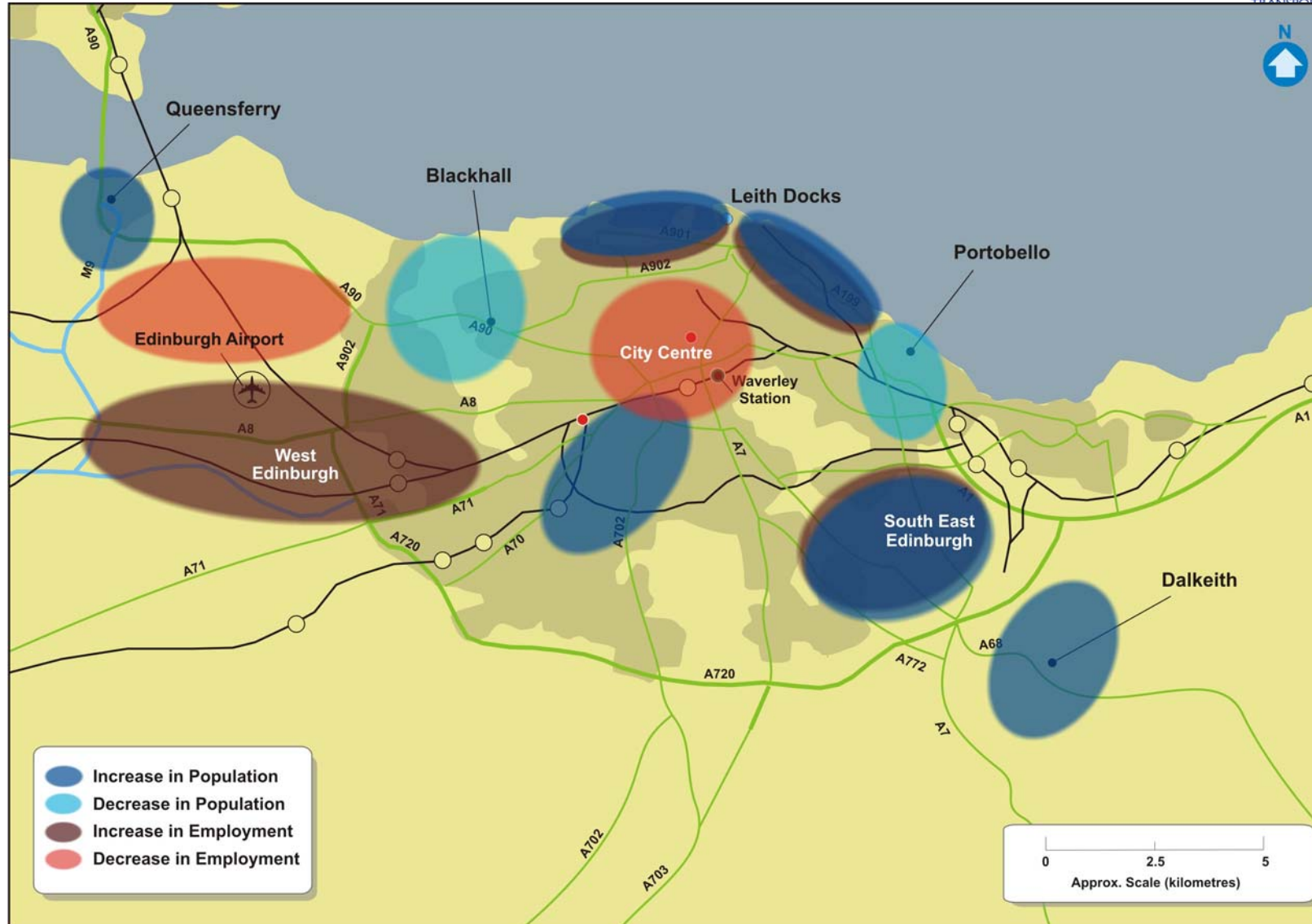


Figure 5.3.2: Change in Employment and Population, 2005 & 2022 - Edinburgh

5.3.2 Land Use Patterns

Within Edinburgh, three areas of economic activity of national significance have been identified as being particularly relevant in terms of the STPR:

- City centre (historic business and retail centre);
- West Edinburgh (expanding business centre and established retail centre); and
- South East Edinburgh (projected significant growth in business with nationally significant employers).

Another key economic generator in Edinburgh is the international airport. The airport, located north of the A8, is one of the fastest growing airports in the UK having experienced an increase in passengers of approximately 160 per cent between 1995 and 2005.

The changing land use patterns, particularly the projected growth in employment on the periphery of the city, will mean new challenges for the city's transport network. The historical focus towards providing high quality public transport services to the city centre from the surrounding areas, whilst still important, will need to be augmented with improvements to peripheral economic locations, including the airport. These patterns have been in evidence in recent years with the increase in the level of orbital movements in Edinburgh to these areas of economic activity. This is forecast to continue in the years to come. This issue has been recognised in the SEStran Regional Transport Strategy²⁰¹.

5.3.3 Transport Network and Operations

Infrastructure and Services

A number of radial routes serve Edinburgh, as shown in Figure 5.3.1. The A720, Edinburgh City Bypass Trunk Road, which stretches from Gogar in the west to Old Craighall in the east, provides the link between these routes. At the western end, the City Bypass connects with the A8 (non-trunk) at Gogar and the M8 Motorway at Hermiston. The A720 is a dual carriageway road with grade separated junctions, except at Gogar and Sheriffhall. The radial routes are a combination of single and dual carriageway.

To the north west of the city, the A90 carries traffic between the Forth Road Bridge and Edinburgh. This route is not directly connected to the A720, although there are indirect links via either the recently opened M9 Spur or the A902 (non-trunk) from Barnton to Gogar.

²⁰¹ SEStran Regional Transport Strategy www.SEStran.gov.uk

Edinburgh Waverley railway station is the second busiest in Scotland and is located in the heart of the city, with Haymarket Station at the western edge of the city centre providing access to the rail network throughout Scotland and beyond. To the east of Waverley is the East Coast Main Line, which provides a link to London and northeast England. There are also branch lines off the East Coast Main Line which serve North Berwick and Newcraighall. To the west, three lines converge at Haymarket: the East Coast Main Line to the Forth Bridge, serving Fife, Perth, Dundee and Aberdeen; the Edinburgh - Glasgow line to the west serving Glasgow Queen Street, Stirling and Bathgate and intermediate stations; and another connection to the west serving Glasgow Central, Motherwell, Shotts and northwest England.

Service patterns vary throughout the day and week but are generally:

- Four services per hour between Edinburgh and Glasgow via Falkirk;
- One service per hour between Edinburgh and Perth;
- One service per hour between Edinburgh and Dundee;
- One service per hour between Edinburgh and Glasgow via Shotts;
- Two services per hour between Edinburgh and Bathgate;
- One service per hour between Edinburgh and North Berwick;
- Two services per hour between Edinburgh and Stirling / Dunblane;
- One service per hour between Edinburgh and London (National Express East Coast);
- One or two services per hour to other English destinations (Arriva Cross-Country); and
- One overnight sleeper service to London.

The main railway stations within the City of Edinburgh Council area currently cater for some 17.1 million passengers per annum (2005). In addition, 15.8 million passengers per annum (2005) pass through stations within Edinburgh city centre²⁰².

Edinburgh has an extensive network of bus services to and from the city centre. The main urban operator in the Edinburgh area is Lothian Buses which is a publicly owned company with over 700 buses and 50 routes. First Edinburgh operates a network of services to and from some of the towns in the Lothians and the Scottish Borders. Stagecoach also operates services into Fife. There are also a range of medium sized and smaller companies operating services.

St Andrew Square Bus Station is the hub for an extensive network of long distance bus services. Citylink and Megabus run services to much of Scotland. Citylink also operate a high frequency service between Glasgow and Edinburgh. Megabus and National Express provide services from Edinburgh to the rest of the UK.

²⁰² Rail industry LENNON data (Station Usage 2004/2005)

Service patterns are generally:

- Four buses per hour between Edinburgh and Glasgow (Citylink);
- One bus per hour between Edinburgh and Galashiels (First);
- Three buses per hour between Edinburgh and Stirling (Citylink/First);
- Three buses per hour between Edinburgh and Dundee (Citylink / Stagecoach);
- One bus per hour between Edinburgh and St Andrews (Stagecoach);
- Two buses per hour between Edinburgh and Dunfermline (Stagecoach); and
- One bus per hour between Edinburgh and Aberdeen (Citylink).

Integrated tickets in Edinburgh are available in the form of the *PLUSBUS* ticket and 'One-Ticket'. *PLUSBUS* covers rail journeys into Edinburgh and provides the addition of unlimited bus travel within the urban network. The 'One-Ticket' gives unlimited travel on bus or bus and rail within designated zones radiating from Edinburgh towards Dundee, Perth, Stirling, Dunbar, Bathgate and Shotts.

In 2005 Edinburgh Airport had a throughput of around 8.4 million passengers and 30,000 tonnes of freight per year²⁰³. Edinburgh Airport provides services to a range of domestic and international destinations. Many operators provide a range of business and leisure services throughout the year. Recent years have seen a major reconfiguration of the parking and access arrangements at the terminal, which have improved conditions for public transport vehicles accessing the airport.

Asset Management

In 2007, 15 per cent of the trunk road network pavement²⁰⁴ in Edinburgh is judged to require structural strengthening as it has no theoretical residual strength. This compares with a national level of four per cent²⁰⁵. Under Transport Scotland's planned maintenance schedule, the net figure for the city is expected to fall to 14 per cent by 2012.

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

Demand Management

The City of Edinburgh Council has invested heavily in the provision of bus priority measures in recent years including 46 kilometres (increased from 30 kilometres in 2000) of bus lanes and 1.5 kilometres of guided busway. This increase in bus lane length can be credited with the consequent enhancement of bus reliability in Edinburgh. These bus priority measures; known as Greenways, focus on five of the major routes into and through the city:

- A8 Maybury to Princes Street;

²⁰³ STS No. 25 (2006) Table 9.6, 9.13

²⁰⁴ Transport Scotland SERIS Database

²⁰⁵ STS No. 25 (2006) Table 5.5

- A900 Leith to Princes Street;
- A702 Leven Street to Princes Street;
- A70 Inglis Green Road to Haymarket; and
- A71 City Bypass to Ardmillan.

Greenways provide buses, taxis and cycles with dedicated road space during times of high demand, in some cases throughout the day, and integrate with the Urban Traffic Control system to give bus priority. Real time information is provided at key stops for passengers.

Edinburgh currently has four Park-&-Ride sites²⁰⁶, three of which are bus based. These are located on the M90 at Ferrytoll (Fife), on the A8 at Ingliston and on the A71 at Hermiston. Additionally there is a rail based Park-&-Ride facility on the A1 at Newcraighall to the east of the city. All of these Park-&-Ride facilities are focused on serving the city centre, although Ferrytoll also provides services to Edinburgh Airport and West Lothian. In addition to these, the vast majority of railway stations located on the various lines servicing Edinburgh cater for a significant number of commuters on a daily basis.

The City of Edinburgh Council's strategy for parking control is aimed at deterring long stay commuters from parking on the city centre. As a result the cost of parking is higher than in most other parts of Scotland. Edinburgh also operates a parking guidance system, allowing more efficient use of off-street spaces and minimising unnecessary mileage on the city network.

In fact, off street parking in Edinburgh costs between £0.70 and £3.00 per hour. On street parking is limited to a maximum of four hours and costs between £0.70 and £1.80 per hour. The high prices and short maximum stay durations suggests that parking is aimed at managing travel demand and encouraging modal shift to public transport²⁰⁷.

Programmed Schemes

Programmed schemes, which are of relevance to STPR, are shown in Figure 5.3.3 and include:

- Edinburgh tram network;
- Improved access from the rail network to Edinburgh Airport;
- Additional services on the Shotts line;
- Borders Rail line;
- Introduction of Park-&-Ride sites at Sheriffhall and Straiton;
- Upgrades of Haymarket and Waverley railway stations; and

²⁰⁶ Edinburgh City Council Park-&-Ride map http://www.edinburgh.gov.uk/internet/Transport/Parking/CEC_park_and_rides

²⁰⁷ www.edinburgh.gov.uk, www.ncp.co.uk

- A68 Dalkeith Bypass.

Plans were in place for an Edinburgh Airport Rail Link with parliamentary consent and funding committed. However, on 27 June 2007 the Minister for Transport, Infrastructure and Climate Change made a commitment to Parliament to consider possible alternatives to an Edinburgh Airport Rail Link. As a result, Jacobs worked alongside Transport Scotland, Network Rail and First ScotRail to consider not only alternatives to an Edinburgh Airport Rail Link, but improvements to journey times between Edinburgh and Glasgow, to form an early strand of the STPR²⁰⁸. On 27 September 2007, the Minister for Transport Infrastructure and Climate Change announced in Parliament that Transport Scotland would progress with the alternative proposals to an Edinburgh Airport Rail Link which include:

- A new airport rail station on the Fife railway line at Gogar, complementing the Edinburgh Tramway project;
- An interchange between the tram and rail network at Gogar which would be delivered in time for the opening of the tram, allowing passengers from Fife and further north to easily and quickly access the airport without the need to travel to the city centre as now; and
- New infrastructure between the Fife and Edinburgh routes – the Dalmeny Chord, allowing Edinburgh and Glasgow trains to stop at the new airport station.

²⁰⁸ Edinburgh to Glasgow Rail Improvements, Jacobs October 2007

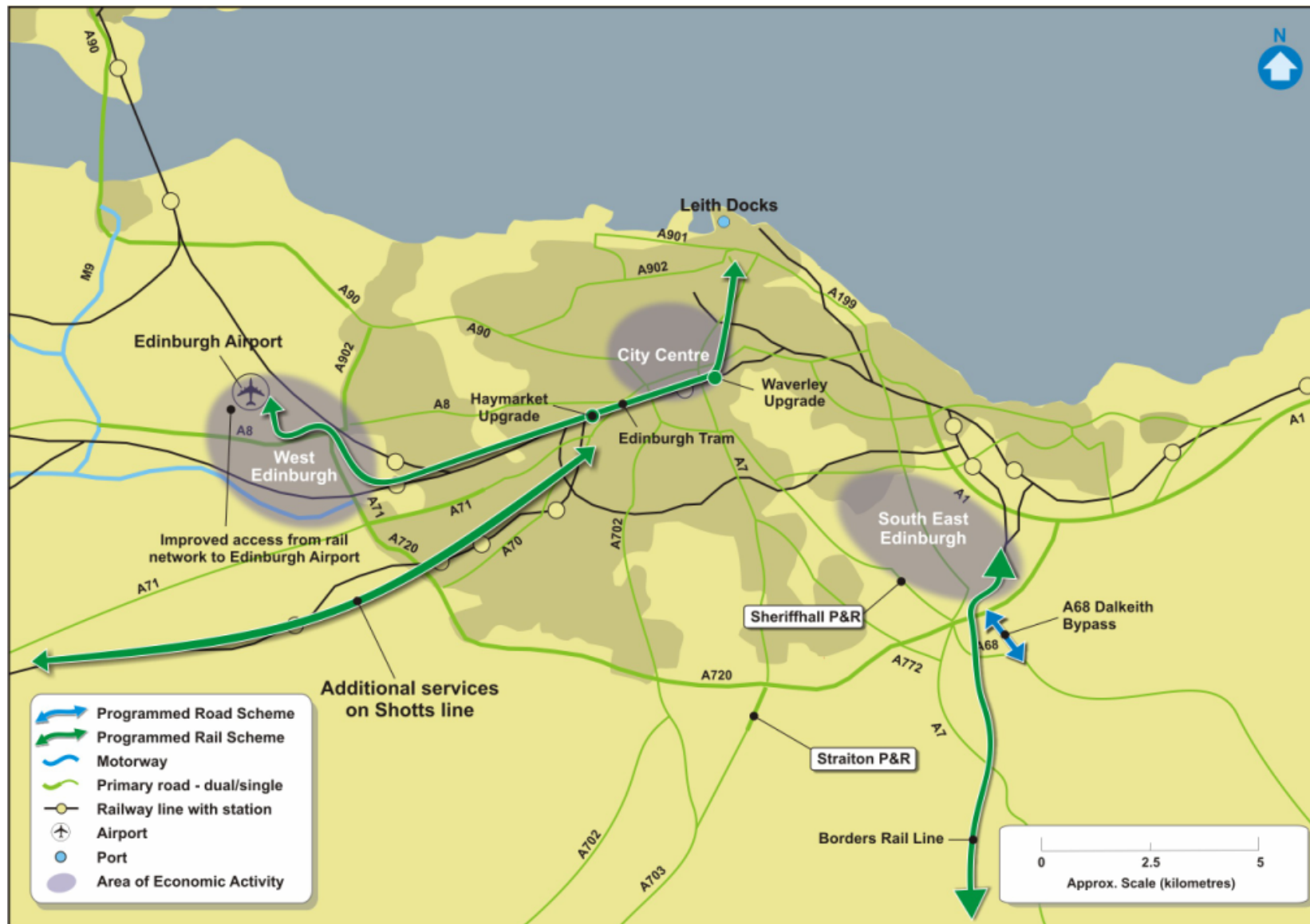


Figure 5.3.3: Programmed Future Transport Schemes, Edinburgh

5.3.4 Travel Patterns

Edinburgh has fast and frequent rail links on the national network. However, in regional terms, it is the extensive urban bus network which caters for approximately 25 per cent of journeys within the city and nearly half of all journeys to work, making it one of the most successful cities in the UK for transporting people by bus. This is also the highest proportion of any city in Scotland²⁰⁹. Despite this high use of public transport, much of the city's transport network experiences congestion during the busiest periods, with particular pressure on the radial routes in the west of the city and the A720 Edinburgh City Bypass. The 46 kilometres of bus lanes and the 1.5 kilometres of guided busway reduce the impact of the congestion on the bus network, helping to provide an attractive alternative to the car. Edinburgh's bus network is widely considered to provide a good service and this is shown in the increase in bus patronage. Between 2000 and 2005, bus patronage increased from 89 million to 105 million passengers per annum.

The Firth of Forth acts as a barrier to the free flow of people and goods from Edinburgh to Fife and the beyond. There are only three crossings: at the Forth Bridge, the Forth Road Bridge and the Kincardine Bridge.

Figure 5.3.4 and Table 5.3.2 highlight the forecast origins and destinations of the trips travelling to, from and through Edinburgh and the respective proportions travelling by public transport. Of the total trips travelling into or out of the city, the greatest level of demand is from Corridor 13 (to / from Glasgow), which accounts for almost 40 per cent of those movements. To the south of the Firth of Forth, approximately 70 per cent of the trips on all corridors have an origin or destination within the city. However, this dominance of the city as a generator is less significant when considering the corridors north of the Forth.

²⁰⁹ The City of Edinburgh Local Transport Strategy 2007-2012

Table 5.3.2: Summary of Demand (12 hour) and Public Transport Share²¹⁰

Corridor Approach	2005		2022		Change	
	Total Trips	PT Share	Total Trips	PT Share	Total Trips	PT Share
Stirling To / from Corridor 10	46,000	22%	57,000	20%	+24%	+12%
Perth To / from Corridor 12	29,000	17%	32,000	15%	+10%	-3%
Glasgow To / from Corridor 13	150,000	16%	191,000	18%	+28%	+43%
Dundee To / from Corridor 14	27,000	28%	31,000	32%	+15%	+31%
SW Scotland and England To / from Corridor 19	59,000	21%	68,000	19%	+15%	+4%
SE Scotland and England To / from Corridor 20	53,000	15%	57,000	13%	+8%	-7%
Total	364,000	18%	436,000	19%	+20%	+21%

²¹⁰ TMfS:05

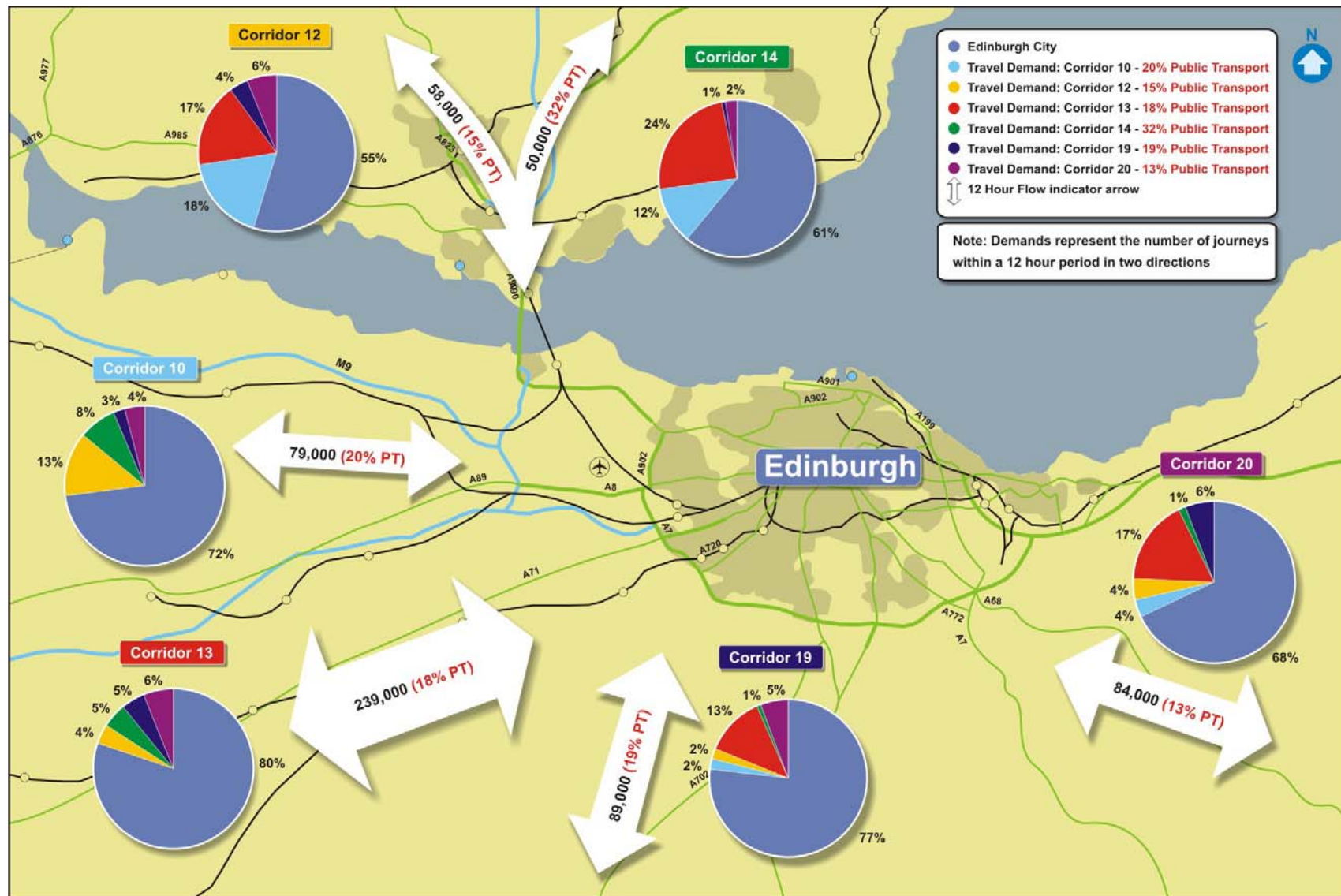


Figure 5.3.4: Travel Patterns to, through and around Edinburgh (2022)

As shown in Table 5.3.2, the absolute numbers of trips travelling by public transport are forecast to increase in line with the overall increase in total demand. However this overall increase masks the fact that in general the bus passenger demand is forecast to decline with a significant increase of approximately 50 per cent in rail demand (including Edinburgh Tram). The most notable increases in the rail demand are forecast to be on the corridors served by the Borders Rail Line and the Airdrie-Bathgate Rail Line. These routes will serve the areas of economic activity in west and southeast Edinburgh. Conversely it is forecast that the number of public transport trips for internal movements will remain fairly constant in the same time period, with the increase in rail and tram use being countered by a reduction in bus passengers. This is in comparison with a significant rise in the number of trips by private car, partly as result of increased levels of car ownership. These forecasts are based on the assumption that the provision of bus services in the future will be the same as they are at present. However, it is likely that in reality the pattern of bus services will be altered in the future to recognise the growing demand to travel to the areas of growth, thereby resulting in a slightly higher share of public transport than is currently forecast in the TMfS.

The percentage of HGV traffic on the A720 Edinburgh City Bypass is approximately six per cent of the AADT which was recorded at 62,000 vehicles in 2005²¹¹.

Travel Patterns – Areas of Economic Activity

In recent years much of the investment in public transport measures has been focused on improving connections to the city centre. However, recognising the growth in West Edinburgh and South East Edinburgh the City of Edinburgh Council developed its 'Access to Growth Strategy' in 2001²¹². The objective of this strategy was to improve public transport provision to these two areas of the city, as well as to North Edinburgh, through the introduction of bus priority measures and enhancements to bus stops and information available to the user.

²¹¹ SRTDb

²¹² www.edinburgh.gov.uk

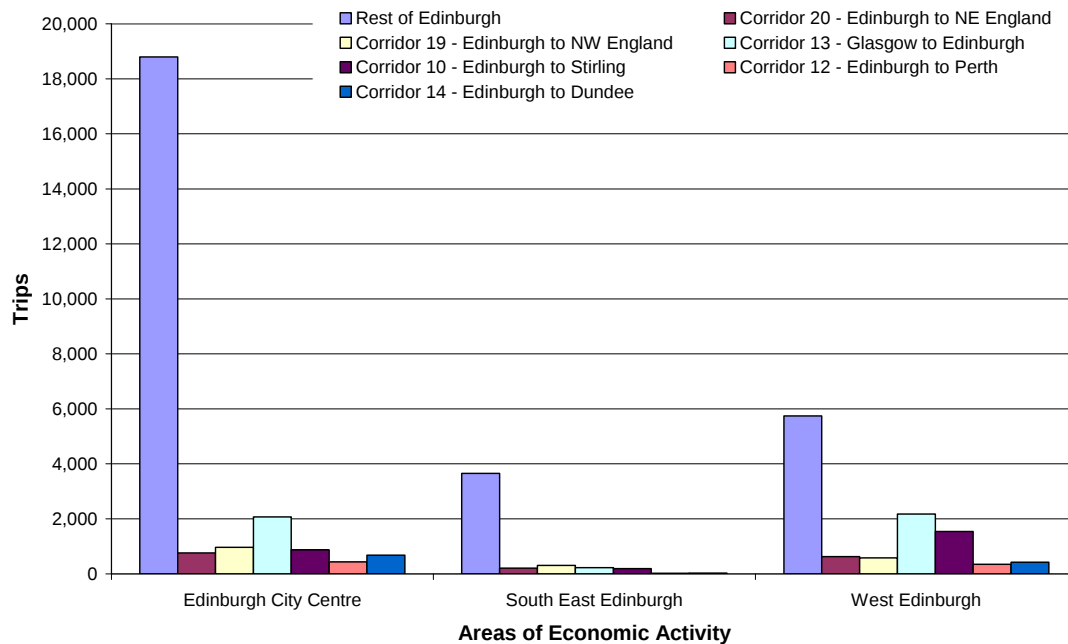


Figure 5.3.5: Travel Patterns to Areas of Economic Activity

Figure 5.3.5 shows that the majority of trips to the city centre and South East Edinburgh originate elsewhere within Edinburgh²¹³. However, in the case of West Edinburgh, the analysis indicates that over half of the trips in the peak are projected to come from outside the city itself, with most of these being from Corridor 13, Edinburgh to Glasgow.

Approximately half of all journeys to the city centre are made by public transport, with many of the rail services operating at capacity in the morning and evening peak periods. However, away from the central area, fewer trips are made by bus or train. For example, only 10 per cent of journeys to the area of economic activity in the west are made by public transport. This is perhaps a reflection of the fact this area is situated adjacent to many of the region's key strategic roads and that access by public transport, particularly rail, is still relatively poor despite the recent measures introduced by the City of Edinburgh Council.

²¹³ TMfS:05

The Edinburgh to Glasgow route is the most heavily loaded inter-urban rail route in Scotland with over 2.5 million rail passenger journeys between the two cities per annum, as well as significant intermediate flows²¹⁴. The demand for rail travel on this corridor is forecast to grow significantly in future years and so a separate study has been undertaken as part of the STPR to consider improving rail connections between the two cities to serve that demand. The study, *Edinburgh to Glasgow Rail Improvements* published by Jacobs in October 2007, provides one of the early strands of the STPR work and considers various packages of improvements to rail infrastructure and services. The key findings of this work are as follows:

- Edinburgh and Glasgow are currently linked by 3 rail routes: Edinburgh to Glasgow via Falkirk, Edinburgh to Glasgow via Shotts and Edinburgh to Glasgow via Carstairs;
- Edinburgh to Glasgow via Falkirk is fastest of the routes - 50 min end to end journey time - high frequency of 4 trains per hour;
- Via Shotts provides linkage for intermediate communities into both Glasgow and Edinburgh – 80 minutes end to end journey time – 1 train per hour;
- Via Carstairs – journey times of 60-70 minutes – mixture of intercity and regional services – low frequency;
- Airdrie – Bathgate will provide fourth route on completion 2010 – end to end journey time of 70min + - 4 trains per hour;
- Capacity constraints on approaches to Glasgow Queen Street Station and on western approaches to Edinburgh;
- Growth on route via Falkirk already leading to some overcrowding;
- Capacity at Queen Street station likely to be constraint beyond 2011;
- Population in areas such as West Lothian will drive up demand for better services on other routes; and
- Growing need for improvements in connections from areas to the west of Glasgow.

Moving forward, the introduction of Edinburgh Tram²¹⁵ will improve public transport connections to two out of the three areas of economic activity areas identified, including growing residential areas of Edinburgh, such as the Waterfront.

Travel Patterns – International Gateways

Despite not having a direct rail link, 20 per cent of travel to Edinburgh Airport is made by public transport. This is the highest level of public transport use to and from any airport in the UK that does not have a direct rail link²¹⁶. One of the major components of the public transport service to the airport is the dedicated Airport Express Bus Service which connects the airport to the city centre as well as Haymarket and Waverley Railway stations.

²¹⁴ Scotland's Railways, Scottish Executive, December 2006

²¹⁵ Transport Initiatives in Edinburgh (TIE) www.tie.ltd.uk

²¹⁶ British Airports Authority A Surface Access Strategy for Edinburgh Airport (2007)

The masterplan for the airport forecasts significant future growth of between 75 per cent and 114 per cent to the year 2020 and the short term target for the airport is to increase the public transport mode share to 27 per cent by year 2011. As well as working closely with public transport operators to achieve this target, the airport is also conscious of the need to balance the demand for parking with provision for 'kiss and fly' trips.

5.3.5 Performance Review

Network performance is considered within the context of the three KSOs:

- Improving journey times and connections;
- Reducing emissions; and
- Improving quality, accessibility and affordability.

Journey Times and Connections

The following paragraphs address the issues of:

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

In reviewing the performance of Edinburgh's transport network in the context of the STPR it is relevant to consider the catchment area for trips, particularly those travelling to and from areas of employment, rather than a general review of journey times throughout the city. Figures 5.3.6b to 5.3.6d²¹⁷ summarise the typical journey times by road and rail for trips to the city centre. Considering these journey times in the context of the city's labour market, it is estimated that approximately 0.8 million of Scotland's population live within a one hour commute of the city centre. The equivalent travel to work areas for West Edinburgh and the South East Edinburgh have populations of 1.5 million and 0.9 million respectively.

The modal shares of trips to these areas of economic activity vary considerably. Public transport caters for 50 per cent of trips to the city centre, reflecting the competitiveness of public transport in terms of journey times, cost and frequency. However, public transport access to West Edinburgh is not as competitive, partly due to the radial nature of the bus services in Edinburgh and the limited access by rail. This is reflected in the lower level of public transport share (10 per cent).

Due to the increased levels of congestion projected in the future, the labour market within a one-hour travel time is forecast to reduce. This is illustrated in Figure 5.3.6a. Setting this in the context of a forecast ten per cent increase in the number of jobs in the city, the forecast increase in congestion and lack of competitive public transport options could have a detrimental impact on the economic performance of the city.

²¹⁷ Journey times for bus/rail include a 20 minute walk/wait time

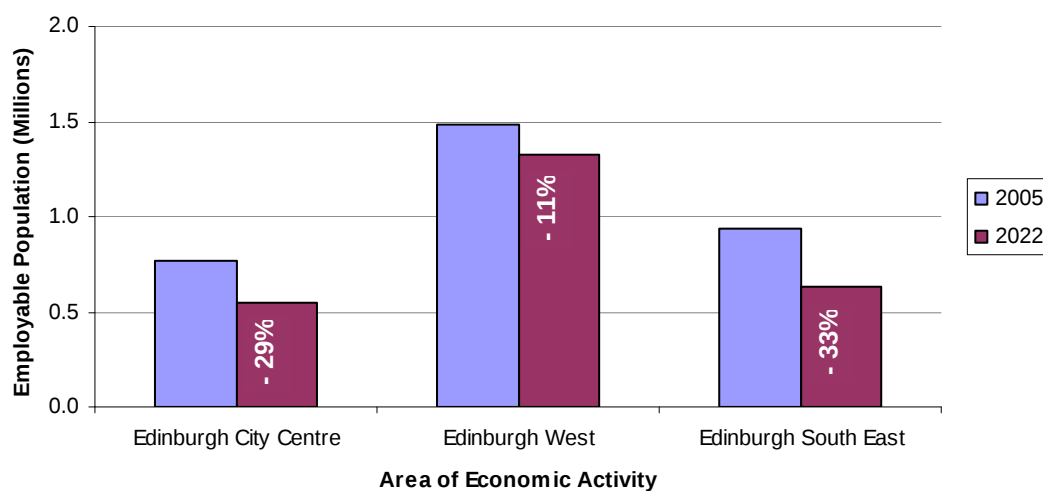


Figure 5.3.6a: Change in Labour Catchment for Areas of Economic Activity



Figure 5.3.6b: Travel to Edinburgh Centre, AM peak 2005

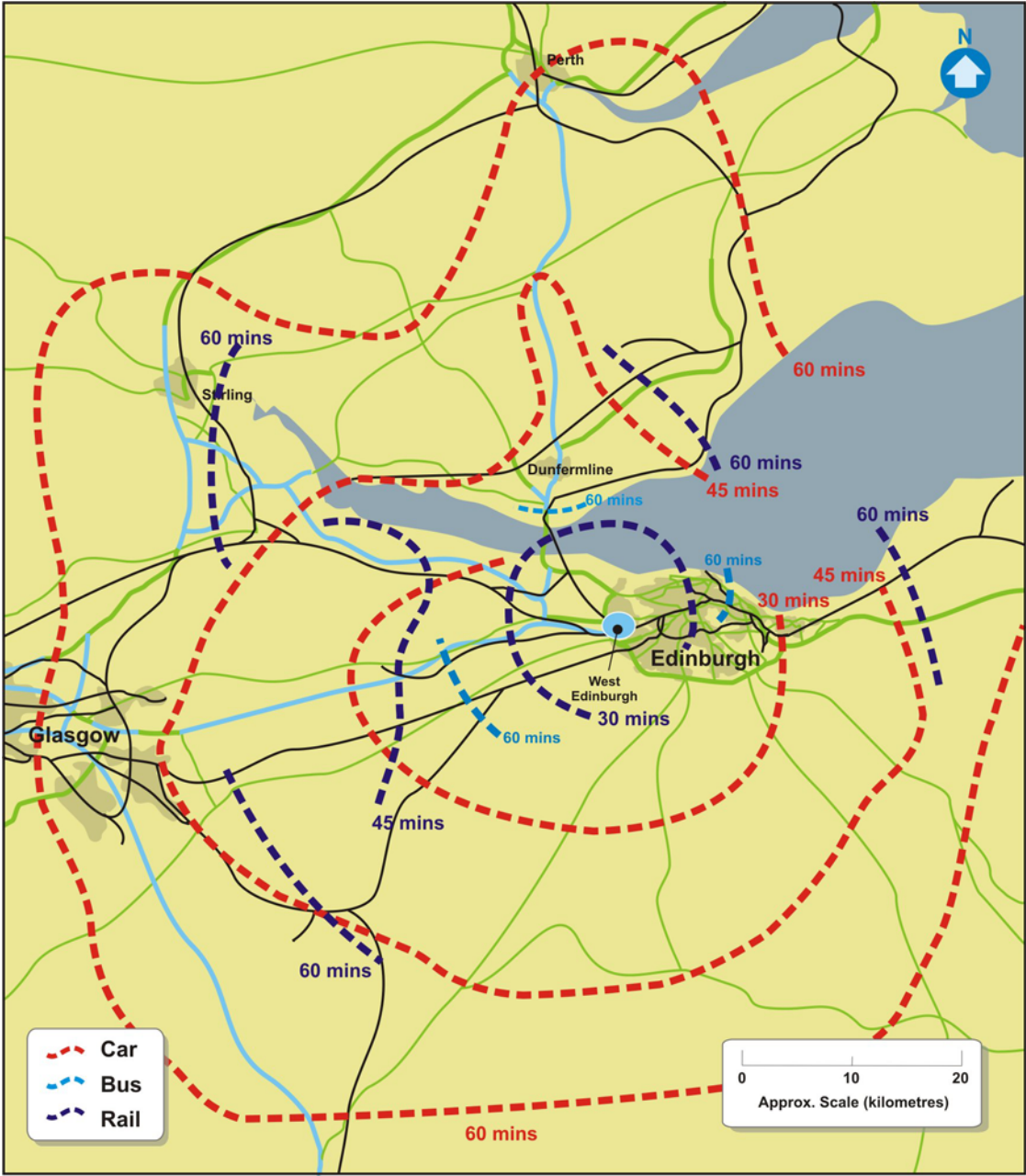


Figure 5.3.6c: Travel to West Edinburgh, AM peak 2005

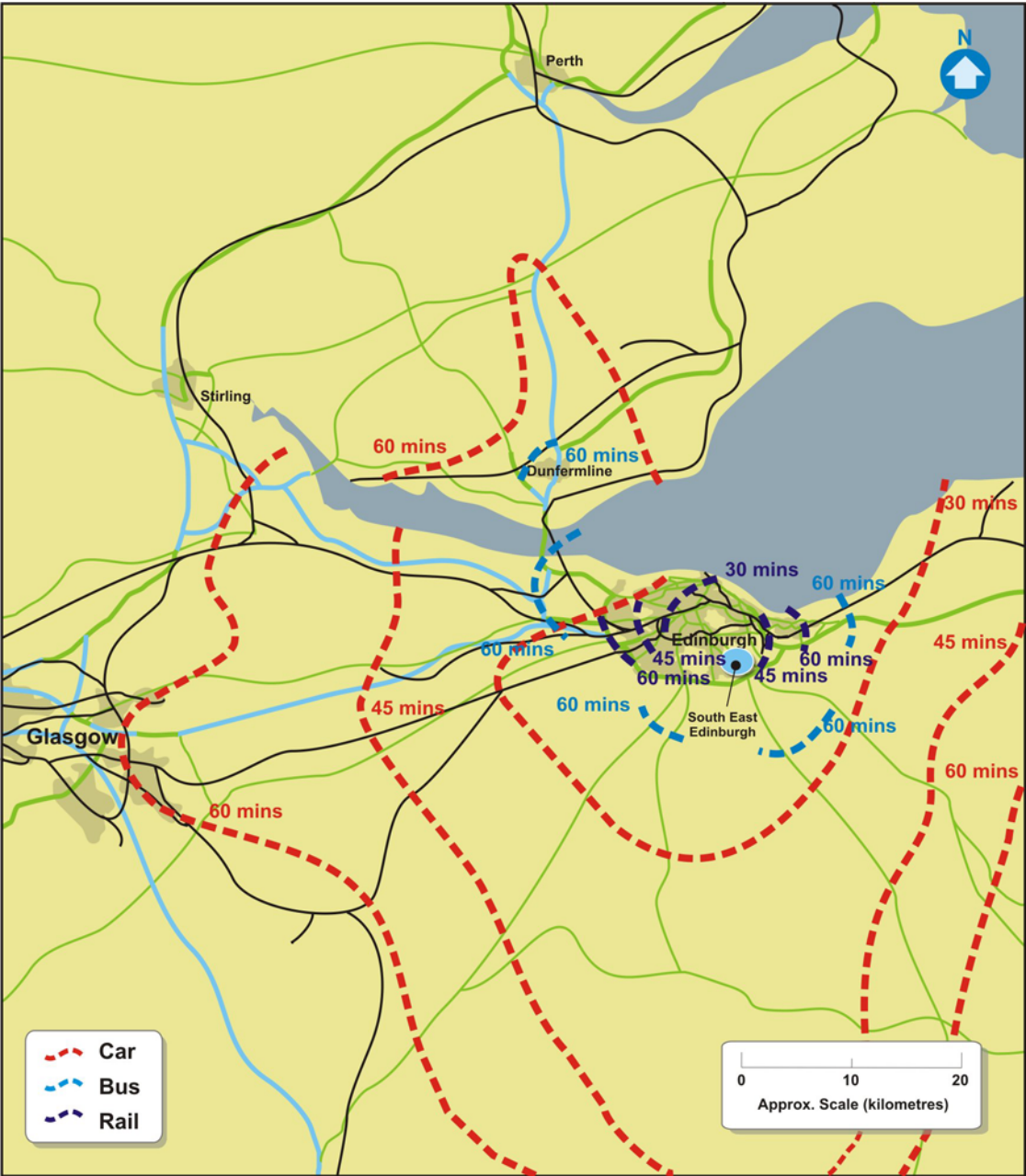


Figure 5.3.6d: Travel to South East Edinburgh, AM peak 2005

Figure 5.3.7 presents details of the average speed on the road network for all peak periods throughout the day. This graph considers key radial routes within the city, such as the A1, A7, A701, A702, A71, A70, A8 and A90, and therefore the average speeds detailed are a result of varying levels of congestion on these given routes. Within the city centre itself, the network is more congested and average speeds will be lower than indicated here.

The variability of travel speed throughout the day and the relationship between free flow and average speeds can be taken to be a proxy for journey time reliability on the road network. As Figure 5.3.7 shows, it is currently possible off-peak to access the city relatively easily by car. However in the future, this option will be increasingly eroded with consistently low speeds and longer journey times throughout the working day. For example it is forecast that average speeds during the off-peak periods in 2022 will be similar to those experienced in the morning peak periods in 2005²¹⁸.

Of the corridors serving Edinburgh the slowest speeds are predicted to be experienced on the A7, A8 and A90 corridors. This is of particular significance given the location of the areas of economic activity. The graph also indicates the 'free flow speed' with the difference between this and the actual speeds providing an indication of the levels of congestion experienced. As this shows by 2022 the actual speeds throughout the city are forecast to be less than half of the 'free flow' speeds. While it would be unreasonable to expect speeds in the city centres to be close to the free flow speeds the forecast 40 per cent reduction in speeds outside the peak periods will lead to significant drop in the efficiency of the road network.

²¹⁸ TMfS:05

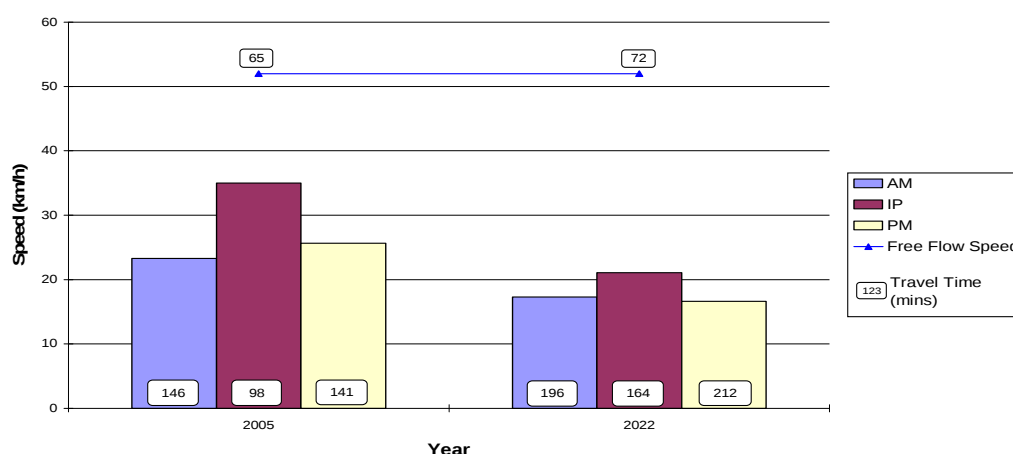


Figure 5.3.7: Average Urban Road Network Speed

It is estimated that in 2005 approximately 30 per cent of the road network in Edinburgh was approaching or above capacity during the morning peak and 19 per cent during the evening peak, compared to only seven per cent in the off peak period. The locations experiencing capacity problems are predominantly located within the city centre and on the key radial routes connecting Edinburgh to its surrounding transport corridors. Due to the projected increase in travel demand over the next 15 years, congestion is expected to increase overall and to spread throughout the day with congestion in the off peak periods projected to increase significantly. As a result of this, approximately 17 per cent of the network in the off-peak is predicted to be operating over capacity in 2022²¹⁹. The consequence of this being, among other things, the negative impact on the economy as well as a likely increase in levels of emissions.

Reliability on the rail network is good as currently measured under the ScotRail franchise, with the latest statistics indicating that ScotRail east 'region' is performing only marginally below the target level of reliability (99 per cent)²²⁰.

In terms of the rail network, the constraints on the network are currently focused on the approaches to Haymarket and Waverley Stations. The section between the two stations currently forms a bottleneck approach to the city. There are also conflicting movements at various junctions including Midcalder, Slateford, Polmont, Winchburgh, Newbridge, Portobello and Haymarket East, and issues with the fast and stopping trains between Edinburgh Waverley and Polmont Junction²²¹.

The Network Rail Route Utilisation Strategy reports overcrowding on some existing services, particularly the Edinburgh to Glasgow via Falkirk High service, the Edinburgh to Glasgow via Shotts service and services from Fife. With the forecast increase in rail demand, as well as a predicted increase in overcrowding, all routes servicing the city will be operating over capacity by 2022, if steps are not taken to address the issue.

²¹⁹ TMfS:05

²²⁰ First ScotRail Performance Statistics; <http://www.firstgroup.com/scotrail/content/aboutus/ourperformance.php>

²²¹ Edinburgh to Glasgow Rail Improvements, Jacobs October 2007

Bus services within Edinburgh benefit at present from having levels of varying priority on the road network. While they will continue to benefit from this in the future on the main radial routes it is clear that the forecast increase in congestion and the subsequent reduction in speeds will impact on buses as well as private cars. In terms of the strategic issues being considered under STPR, the lack of priority measures on the network servicing the areas of economic activity is of particular concern.

Emissions (CO₂ only)

This section of the report addresses the issue:

- What are the levels of transport based emissions within the urban network?

Emissions of CO₂ per person kilometre are forecast to rise from 162 tonnes / million person kilometres to 175 tonnes / million person kilometres between 2005 and 2022. This is a result of CO₂ emissions rising at a slightly greater rate than person kilometres between 2005 and 2022²²².

The road based transport network produced 543,500 tonnes of CO₂ in Edinburgh in 2005²²³. This equates to approximately eight per cent of the total road based transport related CO₂ emissions in Scotland.

By 2022, it is forecast that CO₂ emissions in Edinburgh will rise to around 692,000 tonnes, approximately nine per cent of Scotland's road based transport related CO₂ emissions in 2022.

The rail network produced 2,000 tonnes of CO₂ in Edinburgh in 2007. This equates to approximately two per cent of the total rail based CO₂ emissions in Scotland²²⁴.

Therefore, it is estimated that the road and rail based transport network produced 545,500 tonnes of CO₂ in Edinburgh in 2005. This equates to approximately eight 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?
- How integrated is the transport network?
- Do capacity issues impact on public transport service?
- How safe is the network?

²²² TMfS:05

²²³ TMfS:05

²²⁴ AEA (2001) Rail Emission Model Final Report; www.nationalrail.co.uk; and www.networkrail.co.uk

In the commercial environment, the public transport operators react to the changing demands of users to ensure that services are provided between areas of high demand. Within Edinburgh, the key area of potential concern is the relatively poor access to the areas of economic activity. While this will be addressed to some extent in the future through the programmed tram and rail projects, the ability to serve this market successfully in the future will be of importance to the city and surrounding region.

Although there are several former Social Inclusion Partnership areas in Edinburgh where social exclusion is evident, none are subject to lower than average levels of public transport accessibility. This suggests that the lack of public transport is not a significant contributory factor to social exclusion in Edinburgh.

Considering the competitiveness of public transport to the three areas of economic activity:

- **Edinburgh city centre**, public transport times compare favourably against car. Future conditions will result in improved access by rail (e.g. Airdrie - Bathgate and Borders Rail Line) and a deterioration by car;
- **West Edinburgh**, currently limited access by public transport and good access by car. Future conditions will result in improved access by public transport and deterioration by car; and
- **South East Edinburgh**, currently access by public transport is poor with corresponding good access by car. Future conditions are predicted to result in no significant difference for private vehicles and an improvement in public transport accessibility.

Edinburgh's comprehensive bus and rail network means that it supplies a generally high level of access to key services by public transport. In many areas of the city, public transport is almost, if not more competitive than car options. Major investments such as Edinburgh Trams, Borders railway and the Airdrie to Bathgate Railway, combined with rising road congestion in the city and on the city boundaries will make public transport even more competitive in the future. The biggest improvements in public transport competitiveness will occur in the central and north areas of the City. There are no areas where the competitiveness of public transport is forecast to decline in the future.

Currently just fewer than three per cent of public transport trips through Edinburgh involve interchange and this is forecast to increase slightly in the years to come. This is as a result of future provision for public transport not matching the changing demand for travel. However, it should be noted that this is based on no changes to bus provision in the future, which in practice is unlikely to happen. One of the perceived barriers to multi-modal interchange within Edinburgh is the distance between the main rail and bus stations. Despite being located within approximately 400m of each other, the need to negotiate stairs and cross the main thoroughfare of Princes Street does not provide the ideal environment for interchange. However, the programmed improvements to Haymarket Station and environs will create a more efficient multi-modal interchange facility for public transport users. In addition, the introduction of rail services to Midlothian and Borders will increase the ability to provide cross city services. Notwithstanding this, the forecast increase in through trips by car suggests that for such movements the private car continues to provide the most attractive option.

'One-Ticket' has recently been introduced within the SEStran area providing an integrated ticketing system for the Edinburgh urban network. The 'One-Ticket' is a partnership between the member councils of SEStran and the local transport operators²²⁵.

Measuring the quality of service of public transport is often very subjective. However, a recent survey of public transport users showed that approximately 15 per cent of bus users in the Lothians are not fully satisfied with the level of service provided. This is a higher proportion than the Scottish average, but comparable to the figure for the Glasgow conurbation.

Passenger user surveys repeatedly show that safety and security fears discourage individuals from using public transport, particularly in the evening. However, recent surveys indicate that in comparison to other cities in Scotland, Edinburgh is considered to be a relatively safe city in which to travel by public transport. Within the city approximately six per cent of male bus users and 11 per cent of female bus users expressed a view that they felt either 'not safe' or 'not particularly safe' on buses. This compares with a national average of 11 and 17 per cent respectively. The corresponding figures for rail in Edinburgh are approximately four per cent and seven per cent, compared to national rates of nine and 19 per cent²²⁶.

As expected, within cities, the proportion of severe accidents is lower than the national average, due to slower moving vehicles. Annual average road accident casualties reported from 1994-1998 and 2001-2005 in Edinburgh have fallen by 15 per cent²²⁷. This is lower than the national average of 16 per cent.

Careful attention to design, especially at junctions and in key areas of potential interaction between vehicles and pedestrians, will continue to be needed to sustain this positive trend.

²²⁵ <http://www.one-ticket.co.uk/rail/whoweare.html>

²²⁶ Scottish Household Survey 2003/2004 Perceptions of safety from crime during evening bus/rail travel

²²⁷ Road Accidents Scotland 2005, Table 37

Summary of Infrastructure and Operational Constraints

Figure 5.3.8 highlights the areas of constraints as predicted in 2022 on both the road and rail network.

Particular points of congestion on the road network are predicted to be:

- A720 Edinburgh City Bypass, particularly between Gogar Roundabout and Lothianburn Junction;
- A720 Sheriffhall Roundabout;
- M8 Junction 1;
- A90 approach to Edinburgh; and
- A8 Newbridge to Gogar.

In terms of the rail network, the constraints on the network are currently focused on the approaches to Haymarket and Waverley stations. During peak periods, the network between these two stations operates at its capacity of 24 trains per hour. Capacity will be increased to 28 trains per hour once the current improvement works at Waverley Station are complete. However, these additional paths will be taken up by the Airdrie to Bathgate railway and additional services to Fife. Portobello Junction is also considered to be a constraint on the rail network. Given the forecast increase in rail demand, this will lead to increasing pressure on the reliability and level of service provided by the rail services.



5.3.6 Summary and Conclusions

Overall, how well does the transport network perform?

Edinburgh is a key destination in Scotland with all of the radial roads around the city predominantly carrying users with a destination in the city. Travel demand for trips within Edinburgh is also high with the result that the road transport network in the city is currently operating at or near capacity during the peak periods. The majority of movements in and around the city are made by private car.

Edinburgh does not have an extensive urban rail network but the radial rail lines to the north, east and west provide important facilities for linkage to the city centre and beyond. Services are heavily used during the peak periods. The approaches to Haymarket and Waverley stations have operational constraints which are currently being addressed through investment in infrastructure.

The existing bus services in Edinburgh successfully cater for a large proportion of the population, particularly for those travelling to the city centre from within the city. Journey times are competitive and reliable as a result of the significant investment in recent years in bus priority measures and Park-&-Ride facilities.

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

The close proximity of the employment areas in west Edinburgh and south east Edinburgh to the strategic road network is forecast to result in increased levels of congestion on the A720 City Bypass and on most of the radial routes.

There is significant programmed investment in public transport infrastructure in Edinburgh and the surrounding area. Of particular note, Edinburgh Tram will provide a step change in the provision of public transport to the west of Edinburgh and the Borders Rail Link will provide access to the important employee catchment areas to the south of the city.

While tram and rail improvements will address linkages to areas of economic activity in west and north Edinburgh, there continues to be a heavy reliance on the private car for access to southeast Edinburgh, although the Borders rail line re-opening will make public transport more competitive.

Bus will continue to be an important element of the transport system but private car will continue to be the predominant form of transport both within and through the city.

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

The economic growth of Edinburgh is forecast to continue with the number of employees in the city growing faster than the population. Added to this, the economically active number of people within a one hour journey time is forecast to reduce due through a combination of increasing congestion and dispersal of the population. The combination of these projections is that the economic growth of the city could be affected.

What are the key problems associated with delivering the KSOs?

Over the period to 2022, areas of congestion are forecast to expand over a large area on the approaches to Edinburgh.

The changing land use patterns in and around the city will result in a need to improve access and public transport competitiveness to the periphery of the city. In particular, there will be a need to address the issues of:

- The rail network operating at or close to capacity;
- The need to continue to offer competitive bus services within the context of increasing car ownership; and
- The forecast increase in congestion impacting on journey times and reliability on the strategic road network.

The potential conflict associated with addressing the KSOs will be the need to deliver the economic growth without damaging the environment through increased emissions.