SHEFFIELD CITY REGION TRANSPORT STRATEGY 2011-2026

Evidence Base

DOCUMENT 2: NETWORKS

SHEFFIELD City Region

southyorkshire local transport plan

Published June 2011

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1. Introduction

The Evidence Base

1.1. This document forms part of the series of Evidence Base documents, which are presented here as an Annex to our Third Local Transport Plan (LTP3). This series of documents presents a substantial body of evidence we have compiled while developing the Transport Strategy, which is the first of the two parts of the new LTP3.

1.2. The evidence we have gathered is used to establish the arguments that inform the list of policies included in the Transport Strategy. The wider context for the Evidence Base is provided in Document 1: Geographic and Demographic Overview.

This Document

1.3. This document is the Networks part of the Evidence Base. This document describes our transport networks and relates to all of our goals.

1.4. Chapter 2 introduces the network hierarchy and their description. Chapter 3 describes the trends in the use of the network and modes of travel. Chapter 4 discusses the travel demand on the network. Chapter 5 outlines the performance of the network. Chapter 6 describes our transport assets. Chapter 7 summarises the document.

2. The Transport Network

Introduction

2.1. This chapter outlines the key features of our transport network. This chapter describes broad distinctions between different 'types' of networks in the Sheffield City Region as 'national and international', 'strategic' and 'local' networks. This chapter also discusses the existing, critical network issues that the strategy aims to address.

Network Description

2.2. The Sheffield City Region's (SCR) transport infrastructure is important to allow the efficient movement of goods and people. The transport network provides important links to airport, seaports and to other city regions, in addition to their key function of allowing local movement. Some industries in the SCR cannot function without effective networks. For example, the logistics industry is dependent on the availability of fast, reliable, efficient transport links.

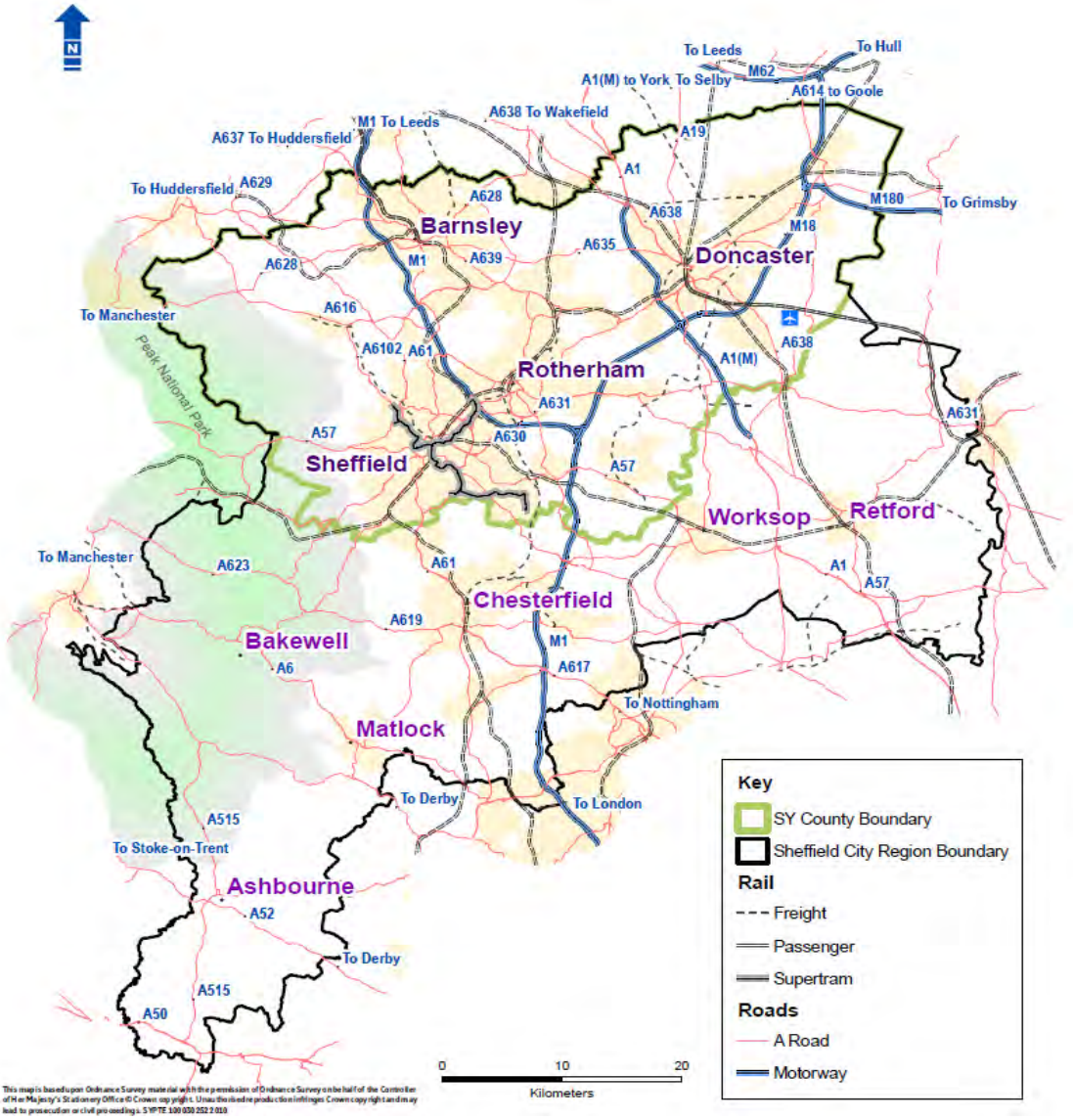
2.3. Figure 2-1 shows the SCR's transport network. This figure shows that networks of radial roads meet at Barnsley, Doncaster, Rotherham and Sheffield. Being at the centre of several strategic networks, the SCR's network gives us potentially excellent connectivity, and is crossed by a number of important strategic highway links, including the M1, A1(M), M18 and M180. Trans-Pennine road links are provided by the A57 Snake Pass and the A616/ A628 Woodhead Pass.

2.4. The rail network emerged from the bulk freight requirements of the coal and steel industries. As a result, rail links can be seen connecting most, if not all, of the towns and cities in the SCR together. Key routes are between Sheffield, Chesterfield and London (Midland Main Line), Doncaster and London (East Coast Main Line), Sheffield and Birmingham (Cross-Country rail route) Sheffield and Manchester (Hope Valley Line), Sheffield and Leeds (two routes: via Barnsley and via the Dearne Valley) and Sheffield and Doncaster. There are many other secondary passenger lines (e.g. Barnsley to Huddersfield) and also a large number of freight lines, many of which are still in use despite the decline of the collieries and heavy industries which brought about their initial construction.

2.5. The undulating topography means that space for road building has always been at a premium. In the 1970's, one response to this constraint was the use of reversible tidal flow lanes on some radial routes into Sheffield. This reduced the need to expand roads and junctions but demonstrates that in district centres the space available for expanding the road infrastructure to accommodate more capacity is limited.

2.6. The relatively few dedicated direct high capacity and high speed road links present challenges in traffic management, particularly for managing routes taken by heavy good vehicles (HGV) traffic. Duplicate routes of similar classification provide increased capacity, but create difficulty in determining a route hierarchy.

Figure 2-1 Sheffield City Region Transport Network



Source: SYPTE, 2011

2.7. The road links are, of course, used by many types of user (for example, car drivers, HGVs, buses, cyclists, pedestrians and in some cases also trams) and some degree of conflict between the needs of these users is inevitable.

2.8. On the rail routes there are also conflicts between different users. For example, bulk freight trains, express trains and local trains wanting to use the same tracks. This results in slow rail speeds and is felt throughout the SCR, but perhaps most significantly through the rail capacity issues on the Hope Valley line to Manchester, and the onward Sheffield–Rotherham-Leeds line.

2.9. Sheffield City Region's network is not self-contained. The networks accommodate important longer distance movements, including substantial quantities of traffic which

travels through the SCR between external origins and destinations. Of particular importance in accommodating longer distance movements are the motorways (M1, M18, M180 and A1(M)), the A6 and the A616/ A628 Trans-Pennine route. The East Coast Main Line, Hope Valley Line and Sheffield to Leeds line also accommodate significant movements of passengers and goods through the SCR.

2.10. Of course, much of the traffic on the road and rail routes is making local journeys, entirely within the SCR, including some longer distance inter-urban travel between the major settlements. There are also significant cross boundary commuting movements in and out of South Yorkshire. Of particular importance are the cross boundary movements to and from West Yorkshire (particularly to Wakefield and Leeds) and to Chesterfield, North East Derbyshire, Bolsover and Bassetlaw.

2.11. The SCR's transport networks comprise numerous and diverse assets, these include: highway surfaces, footways, bridges, structures such as tunnels or retaining walls, drains, sewers and culverts, traffic signals, telecommunication systems, road signs, bus stops and shelters and public transport interchanges. These assets are intensively used and are subject to extremes of weather including heat, heavy rainfall, snow and ice. Through the Transport Strategy, the SCR must maintain its assets so that they operate safely and efficiently, minimising casualty rates and keeping delays for users to a minimum.

Network Hierarchy

2.12. At the heart of the SCR's approach to managing its networks is an identification of which parts of the network are critical to achieving the objectives of the Transport Strategy, then setting out how the authorities in SCR will manage those parts of the network.

2.13. In the strategy we have made some broad distinctions between the different 'types' of network in the SCR, drawing upon ideas developed during the Eddington Transport Study (2006). We define 'national', 'strategic' and 'local' networks.

2.14. We have already made progress in managing our networks. SCR is already differentiating those parts of the network where it is intended to build public transport patronage or where congestion is a particular problem. During the period of the transport strategy we want to build on this, identifying those routes that should be seen as critical on the basis of:

- SCR connectivity to international gateways (ports, airports etc) for both passengers and freight, by road and rail
- SCR connectivity to other city regions and regions (London, Leeds, Manchester, Birmingham, the North-East and Scotland) in particular for business purposes by road and rail
- SCR travel to work connectivity, within and between core places within the SCR – by all modes, and encompassing most journey purposes, in particular travel to work and local goods and service distribution.

2.15. For the Transport Strategy it is therefore proposed to consider the networks on the basis of:

- The national and international network
- The strategic network
- Local networks.

2.16. Table 2-1 gives the approximate length of the roads in each network. As can be seen, the proportion of the whole road network for the SCR which forms part of the national network is very small (2%) despite its importance and amount of traffic level, whilst the strategic network is only another 12% of total length. The vast majority of the roads in the SCR are part of the local network, but carries much less level of traffic.

Table 2-1 Road Network Length

Network	Route (KM)	Proportion of all in SCR
National Network	190	2%
Strategic Network	1,036	12%
Local Network	7,517	86%
Total of all	**8,744**	

National and International Networks

Overview

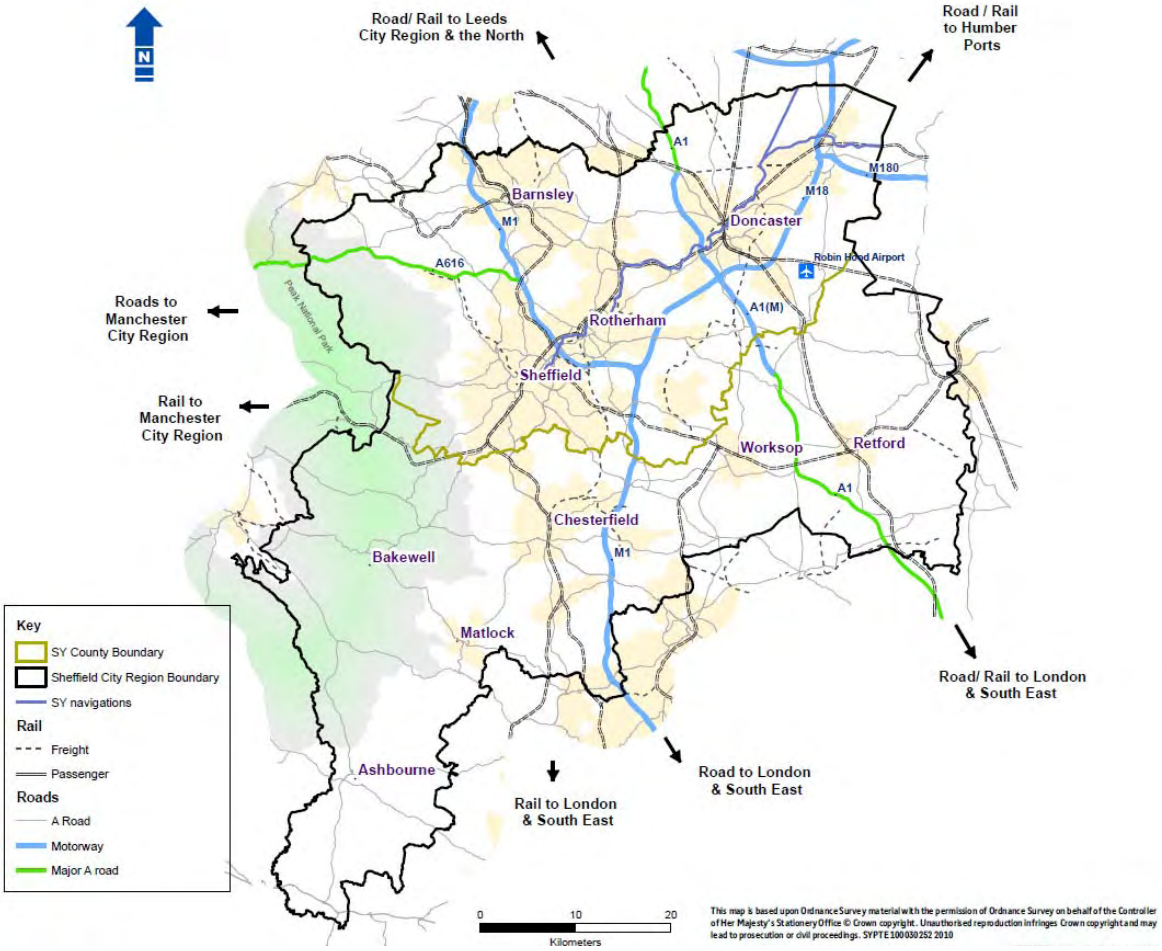
2.17. Effective national links will underpin the SCR's economic development. Research by the Northern Way sets out that links between the northern city regions allow the region to better function as an economic entity through reduced travel costs. For example reducing travel costs between city regions shows a greater economic benefit than reducing travel costs between centres within an individual region. Northern Way have estimated that by reducing travel costs by 5% agglomeration benefits are generated for each district, ranging from £6 to 9 million in Doncaster to greater than £15 million in Sheffield. The greatest potential benefits are seen through reduced travel costs between the northern city regions, and for trips between the north and London.

2.18. The national and international gateways and networks in SCR then are those which cater for longer distance trips – in particular business travel and freight. These are specifically routes which carry large quantities of:

- Inter-district traffic (recognising the use of strategic routes by 'local' traffic)
- National, regional and local rail services
- Traffic into South Yorkshire from West Yorkshire, Derbyshire, Nottinghamshire and Greater Manchester
- Freight
- Inter-urban bus and coach routes.

2.19. Figure 2-2 presents the national and international networks in SCR.

Figure 2-2 National and International Transport Networks



Source: SYPTE, 2011

International Links

2.20. The SCR's only direct international link is at Finningley, where Robin Hood Airport Doncaster Sheffield (RHADS) is located, as it can be seen in above Figure 2-2, although the airport does not currently feature either a direct link from the motorway network or a rail link into the airport[1].

[1] CAP684 UK Airports Annual Statistics (2008) Civil Aviation Authority

Figure 2-3 Robin Hood Airport Doncaster Sheffield (UK) (RHADS)

Source: Robin Hood Airport

2.21. In 2008 a total of 7,881 air transport movements occurred at the airport, catering for a total of 967,801 passengers. In addition, 1,350 tonnes of airfreight were handled at the airport. Scheduled services from the airport in 2008 mainly served short-haul destinations within Europe, whilst charter flights generally served short-haul holiday destinations.

2.22. The SCR must access other international gateways (e.g. seaports, other airports and the continental rail network) over its existing road, rail and inland water links. These links are discussed below.

National Links

2.23. The national network includes the entire rail network in the SCR, managed by Network Rail, and the Motorways and Trunk Road Network, managed by the Highways Agency, shown in Figure 2-2.

2.24. National links are important to the SCR. They provide important links to air and seaports and to other city regions, for example, Leeds, London and Manchester. Such links are vitally important for some of the economic activity in the SCR, for example, the logistics industry, is absolutely reliant on the provision of fast, reliable, efficient transport links. Other sectors, for example, finance and banking, advanced manufacturing and public administration are supported by efficient transport links to head offices (when they are not in SCR) and customers either abroad or elsewhere in the UK (for example Boeing's Advanced Manufacturing Research Centre at Sheffield University or the proposed Rolls Royce and Nuclear Research facilities which will be located at the proposed Advanced Manufacturing Park at Waverley).

2.25. Effective international and national links are also important if the SCR is to benefit from inbound tourism, for example, trips to events in South Yorkshire like the regular Leger week horse racing festival in Doncaster, city trips to Sheffield museums and attractions, or to the Peak District National Park. For example, over 10 million people visit the Peak District annually, the most of any National Park in the UK[2]. Meadowhall, Sheffield's largest shopping complex attracts 20 million visitor a year of which 21% travel from outside the region. Of the 105,000 who travel from outside to shop in all city region

[2] www.nationalparks.gov.uk/press/factsandfigures.htm

shopping centres, 43% (47,800 households) go to Meadowhall. Meadowhall attracts approximately £280m a year from outside the SCR[3].

2.26. Links to other city regions provide opportunities for onward travel to international destinations via an airport and or seaport, for example Manchester Airport in the Manchester City Region and the Humber ports in the Hull City Region.

2.27. For the west of the SCR, North-South links are provided by the M1 motorway and the Midland Main Line. These provide links between SCR and the Leeds City Region, East and West Midlands, London, the South East, East Midlands Airport and the London airports at Stansted, Gatwick and Heathrow. The rail links provide the link to the continental rail network through the Channel Tunnel.

2.28. For the east of the SCR, including Doncaster and Bassetlaw, the A1 and East Coast Main Line provide links with both the north and south, linking the east of the county with the Newcastle City Region, Scotland and London and the south east.

2.29. East-West links connect the SCR to the city regions of Manchester, Liverpool and Hull. They are also crucial for accessing seaports on the Humber and Mersey.

2.30. The key road link to the east is the M18, which provides a high capacity link between the M1 and A1(M) and onwards to the Humber ports. There are also rail links to the east via Doncaster. Links to the west are less satisfactory. The A57 and A616/A628 provide links to the Manchester City Region from Sheffield and Barnsley respectively.

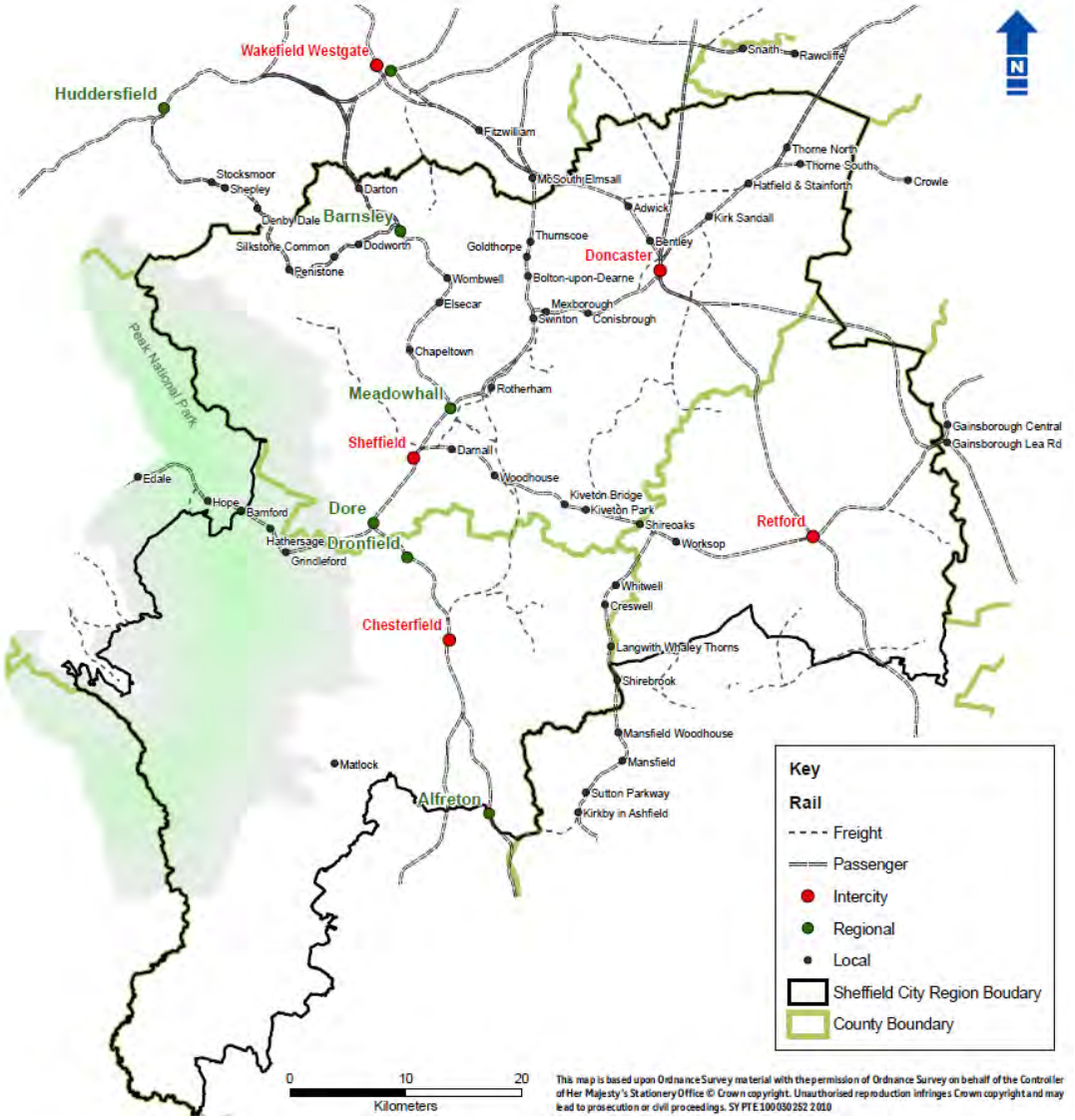
[3] Draft Strategic Economic Assessment (2009) Sheffield City Region

Figure 2-4 The A628 Between the Sheffield and Manchester City Regions

Source: Peak District National Park Authority

2.31. The coverage of the rail network is a function of the size of the network and number of the services operated on it. A detailed map is presented in Figure 2-5, showing the geography of the passenger and freight rail and station network in the SCR.

Figure 2-5 Rail and Interchange Network

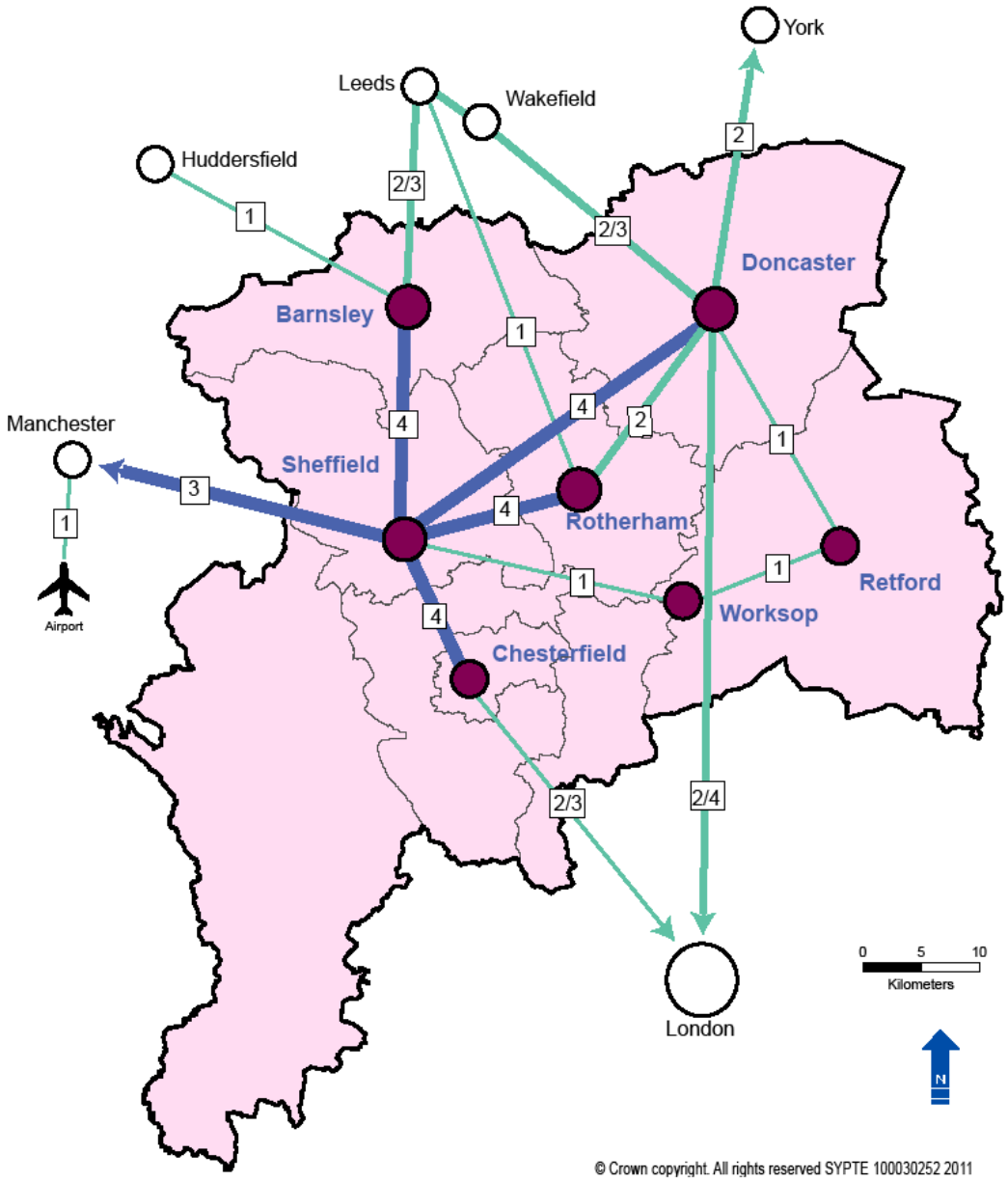


Source: SYPTE, 2011

2.32. Figure 2-5 shows a limited rail network with 30 stations in South Yorkshire plus a further 15 stations in the wider SCR. The stations in South Yorkshire, with direct links to London are in Sheffield and Doncaster. In the wider SCR, Retford and Chesterfield also have direct links to London.

2.33. Figure 2-6 presents diagrammatically the passenger rail service frequencies on the SCR's rail network.

Figure 2-6 Service Frequency on the Rail Network (No. of services per hour)



Source: SYPTE, 2011

2.34. Two of South Yorkshire's main urban areas, Barnsley and Rotherham are served entirely by local rail services, although those to Barnsley provide semi-fast direct links to Sheffield, Leeds and Nottingham. Some central and eastern Dearne Valley towns are served by local stopping services between Sheffield and Leeds or Sheffield and Doncaster. Barnsley has a link west to Huddersfield, via Penistone and Doncaster has links to the east, out of the SCR, to Hull and Lincoln. Worksop and Retford have less frequent services to Sheffield. Rotherham's rail service is relatively limited in frequency to the north and east.

2.35. The passenger network has a high frequency of service, as can be seen in Figure 2-6. However, the coordination of services and the high number of at-grade junctions creates problems. These issues lead to the relatively slow journey times and high levels of 'recovery time' and poor punctuality on some part of the rail network.

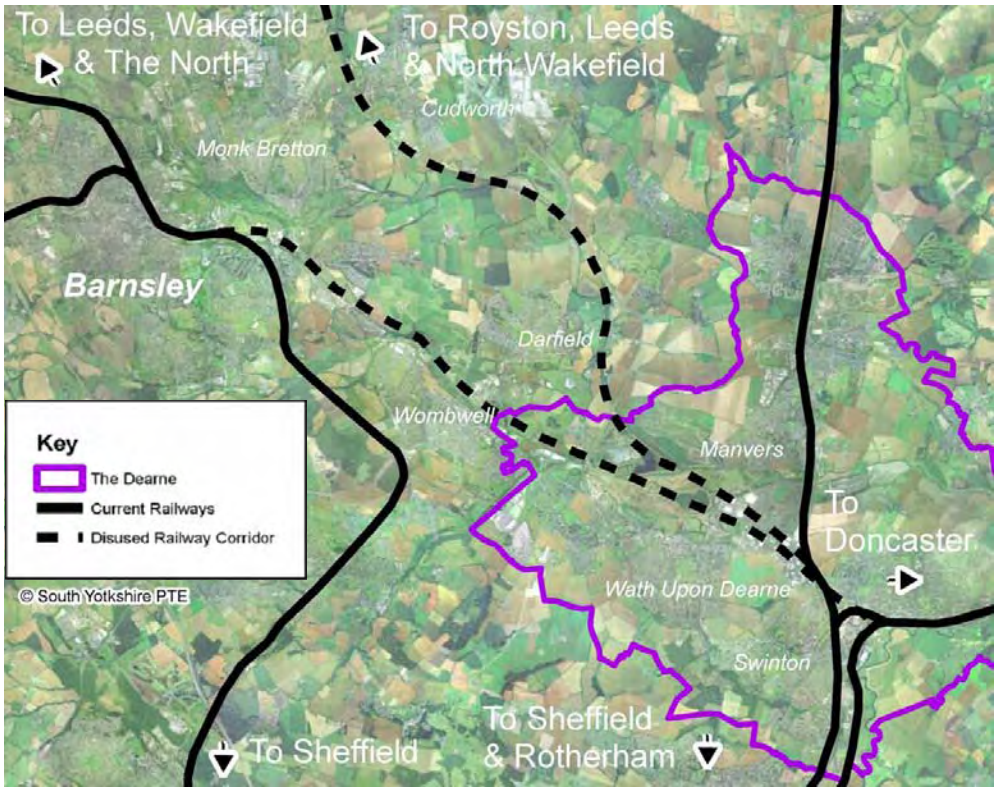
2.36. For example, trains endure at Swinton Junction and trains serving Rotherham Central station suffer due to Holmes Chord single track restrictions. Swinton has been identified as a location at which very substantial reactionary delays occur in respect of both passenger and freight trains.

2.37. There are some missing rail links, notably between Barnsley to Rotherham and Doncaster. Related to the decline of freight, several key rail links were closed in the 1980's, including:

- Manchester – Sheffield to Dearne Valley
- Midland Main Line (Swinton – Leeds via Dearne)
- Doncaster to Barnsley

2.38. As well as contributing towards strong SCR and regional links, these links passed through the former coalfield areas and the Dearne Valley. In addition to the use by rail freight, the availability of quicker transport links to employment that the missing links would provide can be helpful in reducing deprivation and contributing towards regeneration[4]. Figure 2-7 shows two of these three links.

Figure 2-7 Dearne Rail Links



[4] Worklessness Study (2010) Arup

Source: Mott MacDonald, 2010

2.39. A constraint on rail freight movements is loading gauge. This is a restriction on the size of wagon that can be carried. Such restrictions can inhibit the passage of certain types of freight on the network (such as freight carried in modern 'high cube' containers).

2.40. In the South Yorkshire area the gauge is typically W6 and W8, with W9 gauge (W10 gauge committed) on the East Coast Mainline. Network Rail state in the Yorkshire and Humber Route Utilisation Strategy (RUS) that the current pattern of gauge across the wider RUS area is a constraint on freight use, particularly for intermodal container movements.

Inland Waterways

2.41. The Sheffield and South Yorkshire Navigation was the last British waterway to be upgraded for freight traffic with an ambitious series of improvements in the 1970's and early 1980's. The canal links Sheffield with the east coast via the rivers Trent and Humber. This waterway is capable of handling freight vessels, including European barges carrying up to 700 tonnes; however the section from Rotherham to Sheffield only accommodates 90 tonne vessels. The waterway remains underutilised by freight traffic. Recent improvements have concentrated on attracting specific cargoes – for example a new wharf for steel traffic at Thrybergh and there are a number of wharfs serving key plants and facilities in the SCR.

Figure 2-8 Inland Waterways in the SCR

Source: British Water Board

Managing the National and International Networks

2.42. Authorities in the SCR do not have direct control over the national and international networks. Our role is thus one of working in partnership and lobbying through the Integrated Transport Authority (ITA), Derbyshire and Nottinghamshire County Councils to ensure the national network meets the needs of the SCR. The authorities in SCR are already working closely with the planning processes of both the Highways Agency and Network Rail (e.g. through Route Utilisation and Management Strategies), and over the life of the strategy will seek to raise this level of engagement through joint protocols and further closer working.

Strategic Network

Overview

2.43. The ‘strategic’ network comprises a number of discrete networks which together make up a multi-modal network which caters for most of the medium distance travel in the SCR. The Transport Strategy recognises that the elements of the network are crucial to the day-to-day operation of the SCR and in delivering the longer term objective of economic growth.

2.44. The ‘strategic’ network includes the strategic road network and the strategic public transport network. These networks are discussed below.

Strategic Road Network

2.45. There are a number of road routes in the SCR that are of strategic importance to its operation. This is because they:

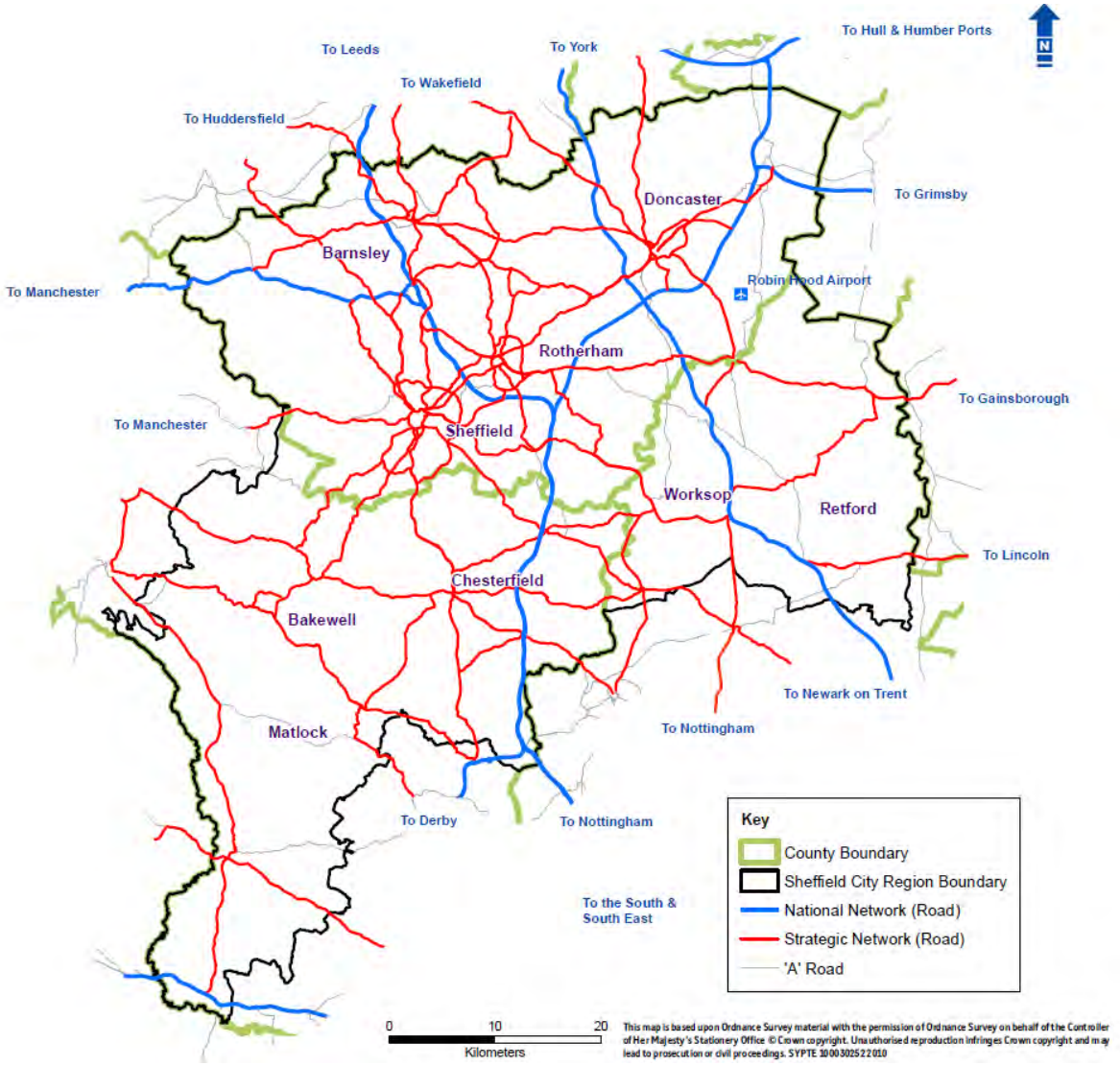
- Are the primary routes between the main towns and national networks
- Carry large quantities of freight traffic
- Are routes which currently suffer from congestion or lack resilience to extreme weather events and which, when congested or closed, compromise the effective operation of other road routes in the SCR.

2.46. Through discussion with the Congestion Network Management Group for the South Yorkshire authorities, Derbyshire and Nottinghamshire County Councils, a network of routes has been identified, shown in Figure 2-9. All of these routes carry high volumes of traffic and many also function as:

- Links to the national network
- Strategic diversion routes, agreed with the Highways Agency, for when the trunk routes are closed
- Routes where freight traffic is encouraged
- Routes where any works are carefully managed to ensure that congestion and disruption is minimised.

2.47. It is intended that the strategic road routes in Figure 2-9 are dynamic, that is to say the designation of strategic routes will change in response to new travel patterns. Over the course of the Transport Strategy it is expected that the identified strategic network will largely stay the same, although some routes may be added in response to development pressure, particularly housing developments. The cycle for updating implementation plans will present an opportunity to review the strategic road network and identify routes which need to be added or removed.

Figure 2-9 Sheffield City Region Strategic Road Network



Source: SYPTE, 2011

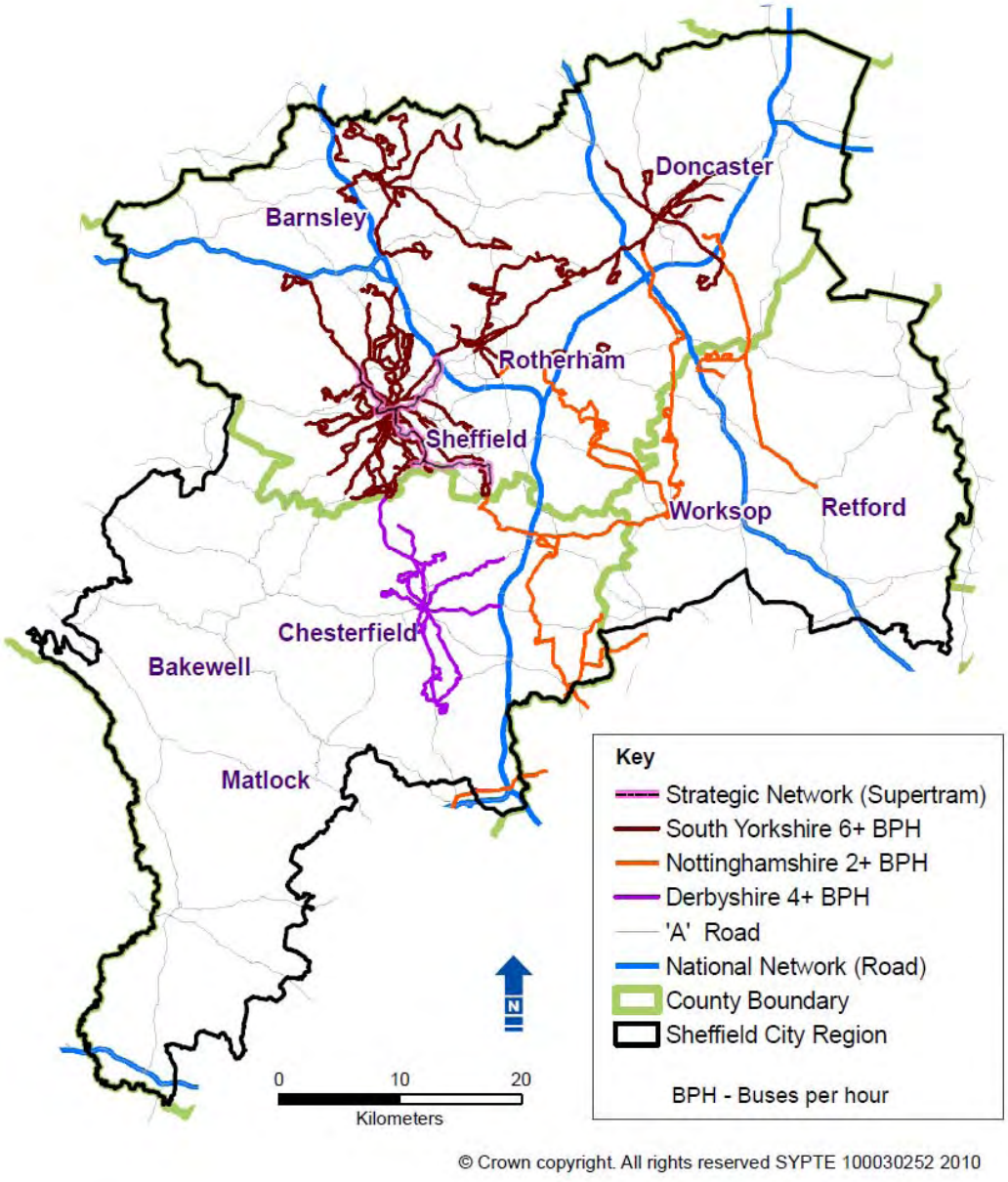
The Strategic Public Transport Network

2.48. The strategic public transport network includes the tram network and the selection of high frequency bus services (termed 'bus key routes') as shown in Figure 2-10.

2.49. The strategic road network and strategic public transport network are not mutually exclusive, since they share similar corridors. In addition, a key characteristic of the strategic network (including both strategic road and public transport networks) is that its routes serve multiple purposes.

2.50. So, for example, the A61 is the main commuting route for traffic to Sheffield from Chesterfield and southern Sheffield suburbs. In parts it is also a route through retail areas and recreational spaces. In addition to this, it is used by some key bus routes. In our strategy for this route, and many others like it, the right balance of these uses must be found.

Figure 2-10 Sheffield City Region Strategic Public Transport Network



Source: SYPTE, 2011

2.51. A key attribute of the key bus route network is that it provides urban-area links often not catered for by any other public transport mode. It can seen from Figure 2-10 that the performance of the strategic network is therefore of importance to the attractiveness and reliability of the key bus route network.

2.52. The high frequency bus routes within the SCR are mostly within urban areas except for Worksop and Retford where the frequency is up to 2 buses per hour. These low frequency services are included for completeness.

2.53. In Barnsley a number of high frequency links are provided to the north and southeast of the town. These link Barnsley to the larger towns and villages of the district, for example Darton, Cudworth and Hoyland. Links southeast to the Dearne Valley link across the district boundary to Rotherham, but do not provide a direct high frequency network to either Rotherham or Doncaster town centre. There is only one frequent link to the west.

2.54. Doncaster has a number of high frequency bus networks radiating from the town centre. These serve outlying towns and villages which have no rail service, for example Bawtry and Armthorpe. Other services provide a high frequency towards Conisborough before diverging to provide services to both Mexborough and Rotherham. There is some overlap between bus and train services, for example from Doncaster to Conisborough, Mexborough and Rotherham and from Doncaster to Adwick le Street.

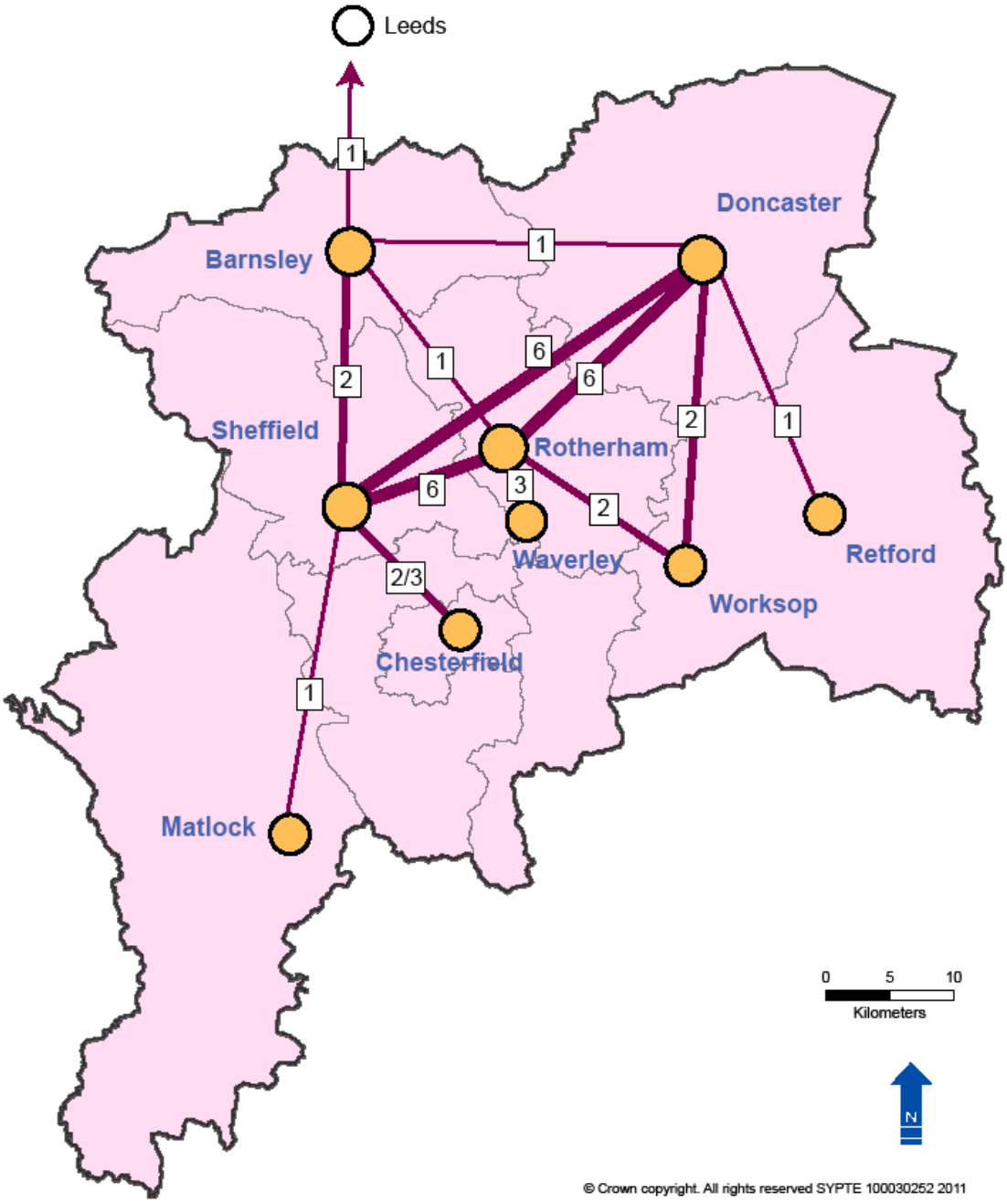
2.55. The key bus route network within Rotherham complements those in Sheffield and Doncaster, with additional links between the town centre and outlying towns and villages. There are direct links between Rotherham and Sheffield, Doncaster and the Dearne Valley towns, which generally overlap with the local rail network. Other services provide links to Maltby and Dinnington which are not linked to the local rail network.

2.56. Sheffield has a dense network of high frequency bus services. These generally radiate from the City Centre towards the outer suburbs, and there are few cross boundary services into adjacent authorities with the exception of Rotherham and Chesterfield. There are also several longer distance routes towards outlying towns, such as Stocksbridge and Chapeltown. The latter route overlaps with the Sheffield to Barnsley local rail service.

Inter-Urban Bus Networks

2.57. Some inter-urban bus routes duplicate rail routes, however, others provide inter-urban links not offered by direct rail services and also provide links to intermediate destinations. These include Matlock to Sheffield, Rotherham to Waverley / Orgreave, Dearne Valley to Barnsley and Doncaster and Worksop to Doncaster as shown in Figure 2-11.

Figure 2-11 Service Frequency on the Inter-Urban Bus Network (No. of services per hour)



Source: SYPTE/ Mott MacDonald, 2009

2.58. To assess the extent to which bus can offer the inter-urban journey quality of rail, a comparison of inter-urban bus journey times was undertaken and compared with inter-urban rail links in the SCR[5]. This comparison is shown in Table 2-2.

Table 2-2 Average Interurban Public Transport Speeds

	Routes Considered	Average Distance (km)	Average Speed (kph)
Corridors served by rail	8	22	33.5
Corridors served by inter-urban bus only	6	20	14.6
Overall Total	**14**	**21**	**22.0**

Source: Mott MacDonald, 2009

2.59. The average journey distances sampled for bus and rail were similar, approximately 20km long. Table 2-2 shows that inter-urban bus services take twice as compared to rail. Comparing rail and bus frequencies also shows that, in many cases, where inter-urban bus services are provided with no alternative rail services, bus service frequencies are also lower. This suggests that these particular inter-urban linkages will be weakest due to the combination of both factors. Examples include;

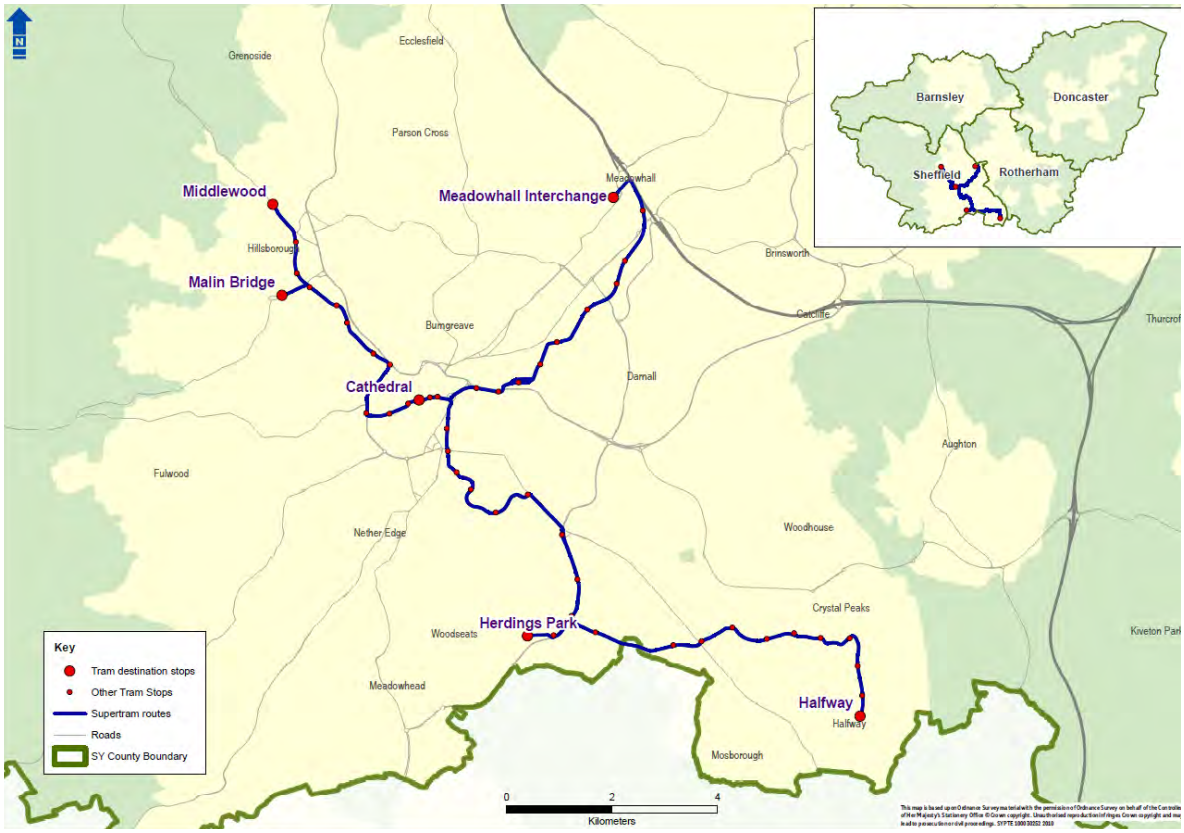
- Matlock to Sheffield
- Rotherham to Waverley / Orgreave
- Barnsley to Doncaster via Dearne Valley.

The Tram Network

2.60. There is a three line tram network in Sheffield, providing a high frequency link between Sheffield city centre and Meadowhall, Malin Bridge / Middlewood and Herdings Park / Halfway. Although the tram network is entirely within the Sheffield district, it offers the potential to contribute towards travel patterns across a wider area in the SCR because of the existence of six park and ride locations across its network. There are also proposals, in partnership with Network Rail, the DfT and Northern Rail, to provide Tram-Trains between Sheffield and Rotherham, using part of the tram route. A detailed extent of the current tram network is shown on Figure 2-12.

[5] Rail corridors are Sheffield to Barnsley, Rotherham, Doncaster, Worksop, Retford and Chesterfield, Rotherham to Doncaster; and Doncaster to Retford. Bus corridors are Sheffield to Matlock, Rotherham to Barnsley, Waverley and Worksop, and Barnsley to Doncaster;

Figure 2-12 The Supertram System



Source: SYPTE, 2011

Public Transport Interchanges

2.61. New public transport interchanges have been constructed in the last five years in Barnsley, Doncaster, Rotherham and Sheffield. The interchanges have been built to a high specification, incorporating customer waiting/ circulation areas, real time information and staffed information kiosks. Smaller interchanges are provided at other locations where there is high ridership.

Figure 2-13 Barnsley Interchange and Thorne North Railway Station

Source: Barnsley Metropolitan Borough Council and SYPTE

2.62. Many smaller locations and rail stations, however, fail to offer modern, clean bright facilities. For example, out of a total of 30 stations in South Yorkshire, only eight are staffed, either full or part-time and only four have the Secure Station Award which is awarded by the DfT and British Transport Police[6].

Governance for the Strategic Networks

2.63. Governance arrangements for the strategic network will build on a) the work already done to deliver schemes in South Yorkshire, where the Local Transport Plan partnership and the PTE have worked with district authorities and bus operators to deliver improvements to important routes on the network, and b) the partnership with Derbyshire and Nottinghamshire County Councils. Arrangements could include:

- Identifying areas of network stress through the current "worst first" approach
- Involving colleagues in other disciplines to highway engineering to resolve conflicts between different users of the networks. For example, considering the role of smarter choices and travel behaviour change as a part of schemes to reduce network stress
- Setting targets which acknowledge the need to achieve improvements for all users of a corridor. For example, seeking to improve journey times for bus users and car drivers
- Making links to colleagues in adjacent authorities. For example West Yorkshire, to implement measures which have an effect across the SCR boundary
- Working with bus and tram operators to implement schemes to improve bus and tram services
- Working to seek more efficiency in network management across the SCR.

[6] SYPTE – Tram and Train Team

Local Network

Overview

2.64. The local networks comprise the majority of the road distance in the SCR (c. 88%), but much less of its total traffic. It also includes footpaths, cycle routes, bridleways and other leisure routes.

2.65. They carry all types of traffic including cars, buses, cyclists and pedestrians. Many of these routes run through residential areas so noise and air pollution from traffic affects those living nearby. As such, effective management of the local network will deliver good quality of life and equality of opportunity.

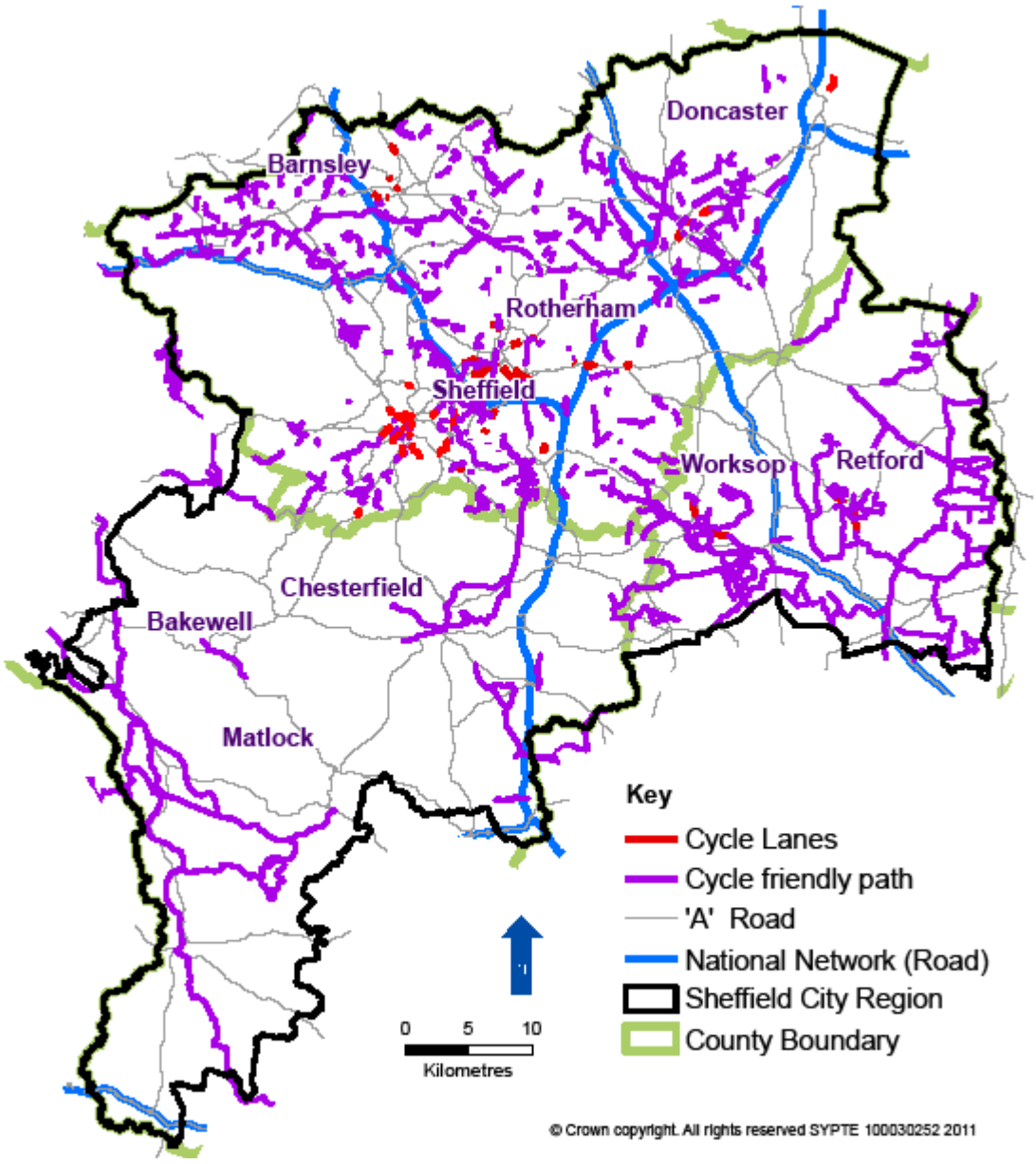
2.66. The local transport network in the SCR has evolved in response to demands for movement which has implications for the transport system today. Effective management of the local network is also important in creating the conditions where people will switch modes to walking and cycling by providing attractive routes, good crossing facilities and provision for cyclists which mitigates the intimidation effects of general traffic.

Walking and Cycle Networks

2.67. Figure 2-14 shows the main cycle lanes and cycle tracks in SCR, not including the national cycle networks.

2.68. As it can be seen in the figure below, most of the cycle network is not fully connected to each other and provides wide gap in the network. Such condition of a network is not ideal to encourage people to cycle.

Figure 2-14 Cycle Lanes and Cycle Friendly Tracks in SCR



Source: SYPTE 2011 / Rotherham, Barnsley and Doncaster MBCs, Nottinghamshire and Derbyshire County Councils

3. Travel Trends

Introduction

3.1. The travel trends in the SCR are examined in this chapter by reference to the modal split, and patronage data. This chapter also includes information about the impact of bus provision and fares on patronage, and also the current level of walking and cycling.

Modal Split

3.2. Table 3-1 shows mode shares for the journey to work in SCR districts.

Table 3-1 Percentage Travel to Work in SCR by Mode

Mode	Barnsley	Doncaster	Rotherham	Sheffield	Bolsover	Chesterfield	Derbyshire Dales	NE Derbyshire	Bassetlaw	SCR
Car as driver	60.9%	58.6%	62.6%	52.4%	64.5%	59.4%	61.3%	64.9%	63%	58.3%
Car as passenger	9.1%	8.4%	8.1%	6.5%	8.1%	8.5%	6.2%	7.6%	7.8%	7.6%
Rail	1.1%	1.4%	0.4%	0.7%	0.7%	0.7%	1%	0.5%	0.9%	0.9%
Light rail	0.0%	0.0%	0.4%	2.8%	0.1%	0.1%	0.1%	0.5%	0%	1%
Bus	8.1%	10.2%	11.8%	17.8%	5.7%	9%	2.9%	7.7%	3%	11.2%
Motor-cycle	0.4%	0.4%	0.3%	0.7%	1.1%	1.1%	0.6%	1%	1.1%	0.9%
Cycle	0.8%	2.8%	0.8%	1.1%	1.3%	1.5%	1%	0.8%	3.5%	1.5%
Walk	10.9%	9.3%	7.3%	10.4%	9.9%	11.3%	12.1%	7.3%	10.7%	10%
Work from home	7.3%	7.7%	7.2%	7.0%	7.8%	7.4%	14%	9.2%	9.3%	7.8%
Other	1.4%	1.2%	1.1%	0.6%	0.6%	1%	0.9%	0.6%	0.7%	0.7%

Source: 2001 Census

3.3. As can be seen in Table 3-1, car driver is the most important single mode for each district, with car passenger, bus, walk also being important modes, along with working from home. In Sheffield, the tram network accommodates 3% of journeys to work, plus 0.4% of journeys to work which originate in Rotherham (but will involve travel into Sheffield). Rail is also used more in Doncaster than in the other districts. Car use is least in Sheffield, with bus use correspondingly highest.

3.4. Cycling is a minority mode, but is used more in Doncaster, which is relatively flat, than in Barnsley, Rotherham or Sheffield. Relatively more people in Derbyshire Dales, Chesterfield, Barnsley and Sheffield walk to work as compared with other SCR districts.

Car Travel

3.5. Car ownership rates in South Yorkshire have historically been low. The proportion of households without access to a private vehicle for the constituent authorities of the SCR is presented in Table 3-2.

Table 3-2 Percentage of Households in SCR without Access to a Private Vehicle, 1981-2001

	1981	1991	2001
Barnsley	50.6%	40.6%	32.2%
Doncaster	47.7%	39.0%	30.7%
Rotherham	45.9%	38.2%	29.7%
Sheffield	51.8%	44.9%	35.7%
South Yorkshire	**49.6%**	**41.6%**	**32.8%**
Bassetlaw	37.7%	30.4%	23.6%
Bolsover	46.7%	35.9%	27.5%
Chesterfield	46.7%	37.7%	30.4%
Derbyshire Dales	29.5%	22.9%	16.8%
North East Derbyshire	34.6%	28.1%	22.4%
Sheffield City Region	**47.0%**	**38.9%**	**30.6%**

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3.6. Table 3-2 shows how dramatically car ownership levels have increased over the last 30 years. Households without access to a private vehicle accounted for nearly 50% of all households in South Yorkshire in 1981, falling to around 33% of all households by 2001.

3.7. There are also significant differences between the rates recorded in the various districts. For example 36% of households in the more urban area of Sheffield do not have access to a private vehicle whilst in the more rural area of Derbyshire Dales were public transport provision is poorer and where journey lengths are likely to be higher the proportion is as low as 17%. The proportions of households without access to a vehicle have historically been lower for the SCR area compared to South Yorkshire, as the former includes more rural areas in Derbyshire.

3.8. Should the trend observed between 1991 and 2001 continue towards 2026 a vastly different picture of car ownership would emerge in the SCR. The overall proportion of households in the SCR without access to a private car would tend towards 15%.

3.9. In a similar trend to car ownership levels, the number of car vehicle kilometres per year has continued to increase over the last 15 years. A 27% increase in car vehicle kilometres was recorded in South Yorkshire between 1993 and 2008, which compares to a national increase of 23% over the same period. A breakdown in changes in kilometres by area is provided in Table 3-3.

Table 3-3 Change in Car Vehicle Kilometres, South Yorkshire Districts

	1993-1998	1998-2003	2003-2008
Barnsley	8.4%	14.5%	4.4%
Doncaster	15.6%	10.3%	5.8%
Rotherham	15.6%	2.8%	6.3%
Sheffield	9.4%	7.9%	0.4%
South Yorkshire	**11.1%**	**8.6%**	**4.1%**
Great Britain	**11.2%**	**7.0%**	**3.8%**

Source: DfT, Road Traffic Statistics for Local Authorities: 1993-2008

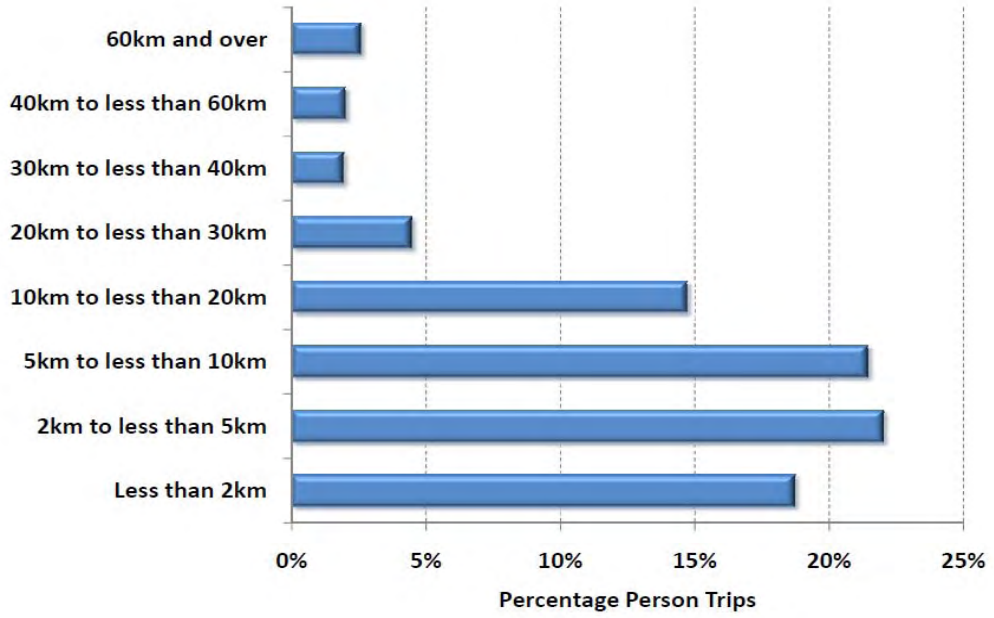
Note: Statistics reported by County for Derbyshire and Nottinghamshire, which do not correspond to areas within the city region boundary, therefore no figures are provided for Sheffield City Region

3.10. Table 3-3 shows that although the general trend is for an increase in car usage over the last 15 years, the rate of increase has slowed over time. This is true not just for South Yorkshire but for the country as a whole. Whilst the increase in vehicle kilometres was recorded as 11.1% in South Yorkshire between 1993 and 1998 this had fallen to a 4.1% increase between 2003 and 2008.

3.11. Car use in South Yorkshire has closely followed the national average. Despite this there have been local variations, for example the low levels of growth seen in Rotherham between 1998 and 2003, and the very low growth rates seen in Sheffield between 2003 and 2008.

3.12. Figure 3-1 below shows that nearly 40% of all travel to work trips in SCR are less than 5km. These trips could potentially be suitable to be undertaken be bike or on foot and therefore reduce the car use in SCR. Similarly, trip lengths between 5km and 20km form of around 35% of total trips to work, again these trips could be reduced by encouraging more car-sharing in the SCR area.

Figure 3-1 Travel Distance to Work in SCR



3.13.

Source: 2001 Census

Public Transport Travel

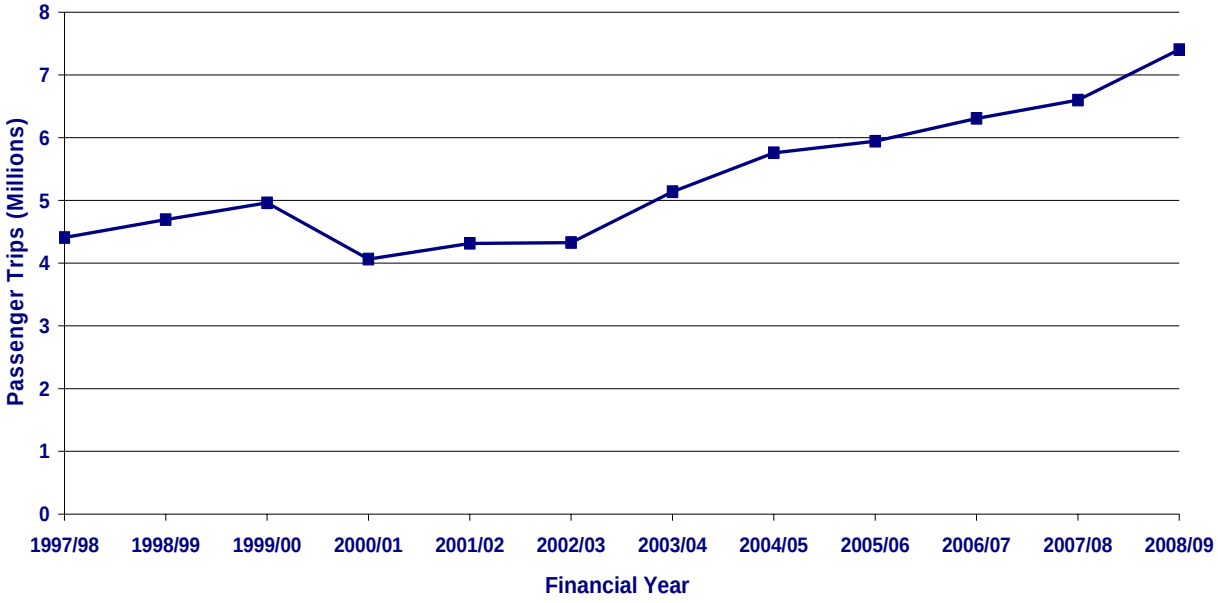
Rail

3.14. Rail patronage has grown very quickly from a relatively low base since 1998 from around 4 million passenger trips. A continuation of the patronage trend sees over 8 million passengers in 2009/10. The rail patronage trend is shown in Figure 3-2.

3.15. This growth in patronage trend brings with it problems of overcrowding both on trains and at stations. However, despite the low use of rail in relative terms (as shown in Table 3-1), the increase in patronage represents a considerable success story for a rail network which is currently limited in its coverage.

3.16. To illustrate the implications of this growth, continuing at 6% per year (the rate recorded over the last 10 years) then patronage would rise to 20 million journeys per year by 2026 if the linear rate of growth was both maintained and unconstrained.

Figure 3-2 SCR Northern Rail Patronage (Franchise Rail Only)

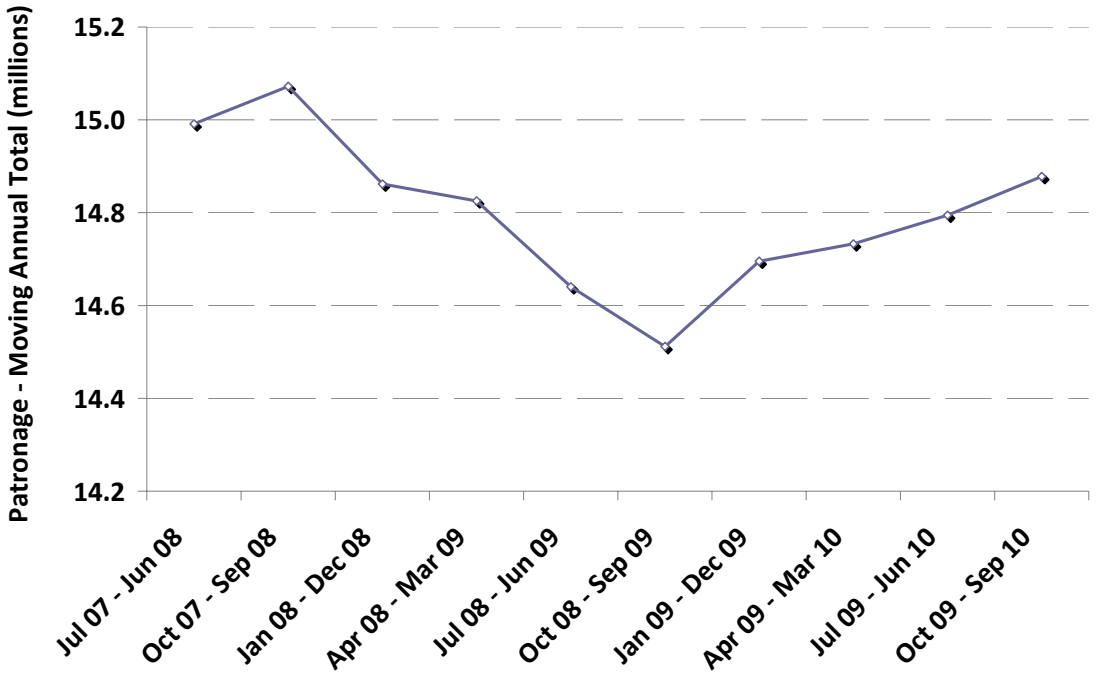


Source: SYPTE, 2010

Tram

3.17. The tram network is used by 15 million passengers each year. Patronage growth of around 4% per year has been experienced between 2005/06 and 2008/09. The supertram patronage trend is shown in Figure 3-3.

Figure 3-3 Supertram Patronage



Source: SYPTE, 2011

3.18. The data shown in Figure 3-3 represents around a 13% increase in growth since 1997/98. However, the growth in patronage levelled off from 2008, with an annual rate of growth of only 0.4%. The negative outcome of this growth is that peak time services are often overcrowded.

3.19. Unconstrained growth of 2.2% per annum, which has been recorded during the lifetime of LTP2, would result in a total of 20.1 million passengers using the tram system by 2026. Future growth at this level would result in overcrowding on the system, if nothing is done to increase the capacity.

Bus

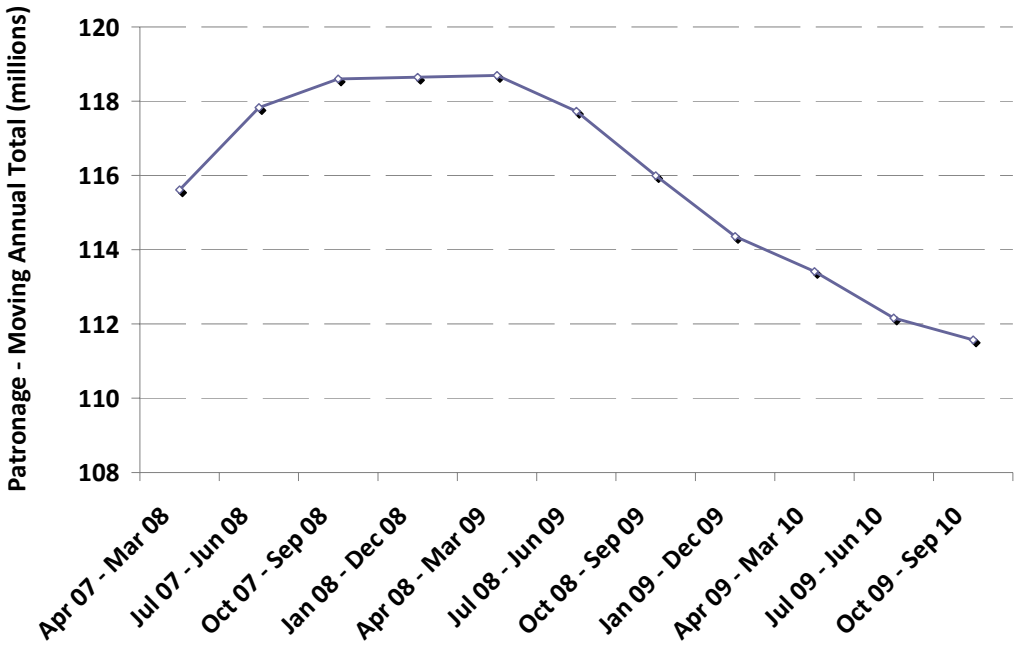
3.20. Bus patronage is currently 115 million, around 14 times that of rail, however this represents a marked decline on patronage in recent years.

3.21. South Yorkshire has lost 26% of patronage since 1995. Before bus deregulation, South Yorkshire enjoyed high levels of fares subsidy which ensured consistent patronage levels, but this resulted in disproportionate fares increases when the subsidy was removed.

3.22. This situation was further exacerbated by economic changes, a consequent loss of jobs and population and along side this, a growth in car ownership has been higher than the national average and this has had a further disproportionate effect on public transport patronage.

3.23. After many years of falling patronage, between 2004/5 and 2007/08 the number of bus passengers in South Yorkshire increased. However, despite the overall improvement in patronage on the bus network, patronage from 2008 to 2010 has not lead to a long term trend as patronage has fallen. This fall is show in Figure 3-4.

Figure 3-4 South Yorkshire Bus Patronage



Source: SYPTE, 2011

3.24. To understand a change in the market, bus operating mileage is used as an overall measure of service provision. Mileage can vary due to a range of factors; the overlying cumulative trend in South Yorkshire is consistently downward. This is shown in Figure 3-5.

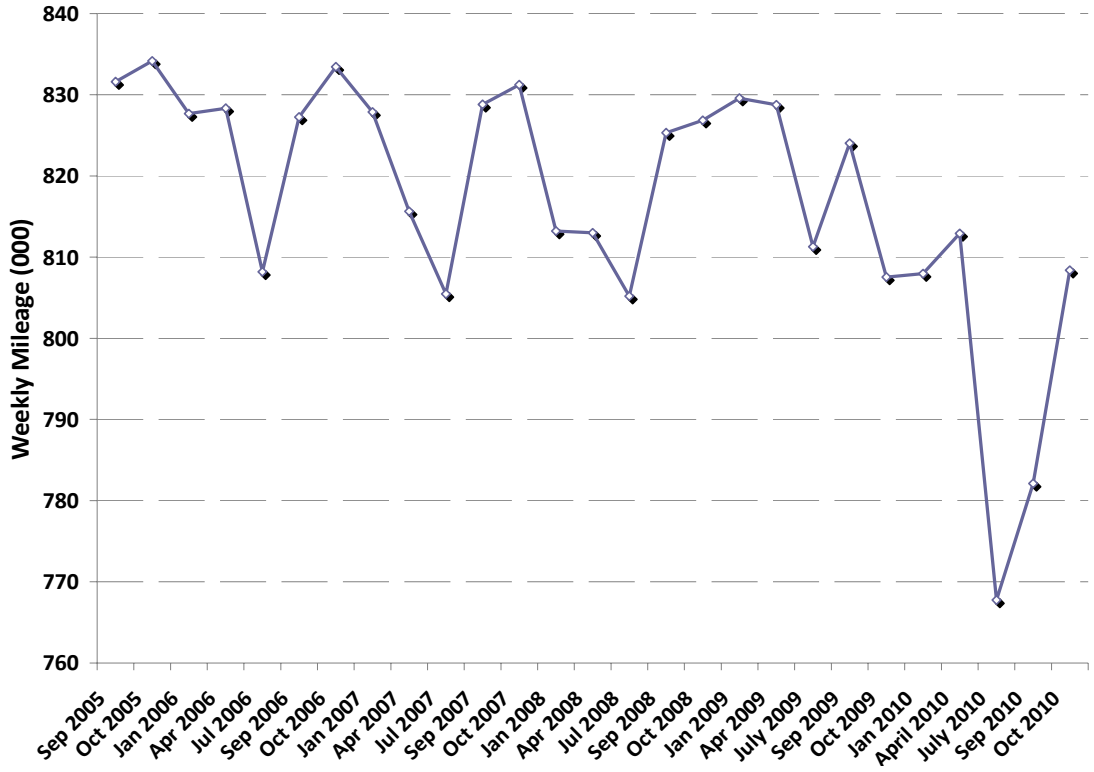
3.25. Further analysis shows a steep decline in mileage operated by First South Yorkshire and an increase in that operated by Stagecoach and other smaller independent companies. However, an overall bus mileage reduction is noticed with a loss of 1.2 million operating miles per year as illustrated in Figure 3-5.

3.26. Congestion on the road network plays a part in the declining viability of the bus network, and it has not been possible to enact all of the bus priority measures which are required to free bus services from congestion.

3.27. A further reason for the decline in bus patronage in South Yorkshire is the price of fares. A steep decline in patronage was recorded in 1986 following bus deregulation, and this declining trend has continued through the 1990's and 2000's. This change is shown in Figure 3-6, together with the corresponding change in average bus fares.

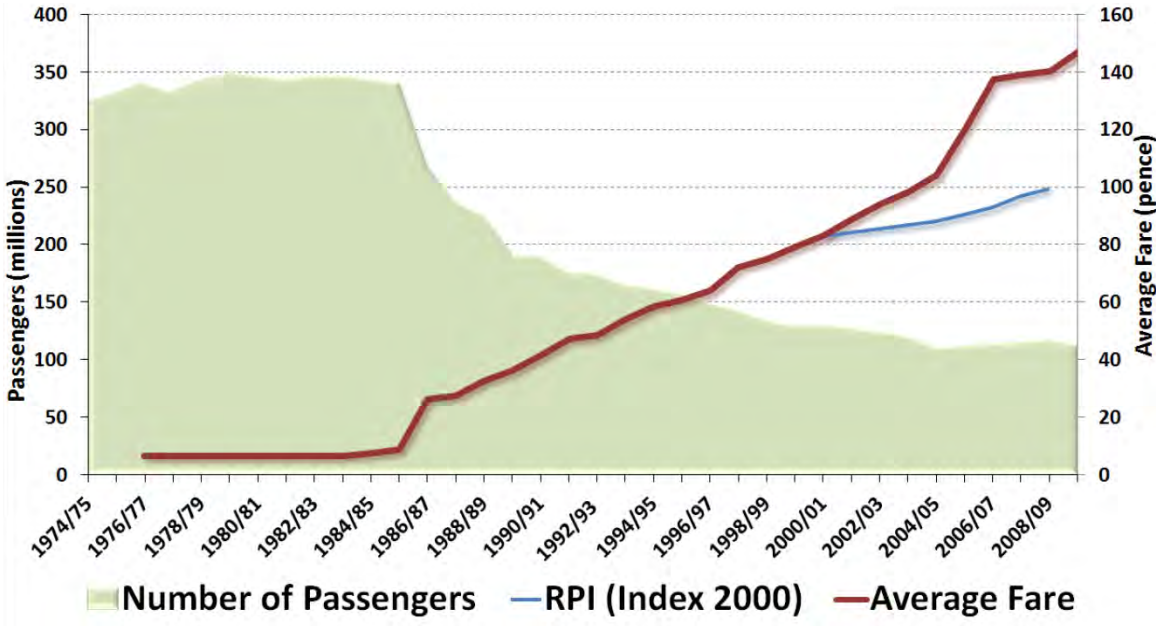
3.28. Bus fares in South Yorkshire were traditionally low in the 1970's and 1980's. An upward readjustment in fares occurred in 1986 following deregulation which corresponds to the large decrease in patronage levels. Fare levels have continued to rise, well above the rate of inflation (retail price index) with steep average fare increases occurred in South Yorkshire in both 2005/6 and 2006/7.

Figure 3-5 Weekly Bus Mileage Change in South Yorkshire, September 2005 Index



Source: SYPTE, 2011

Figure 3-6 Changes in Bus Patronage and Fares



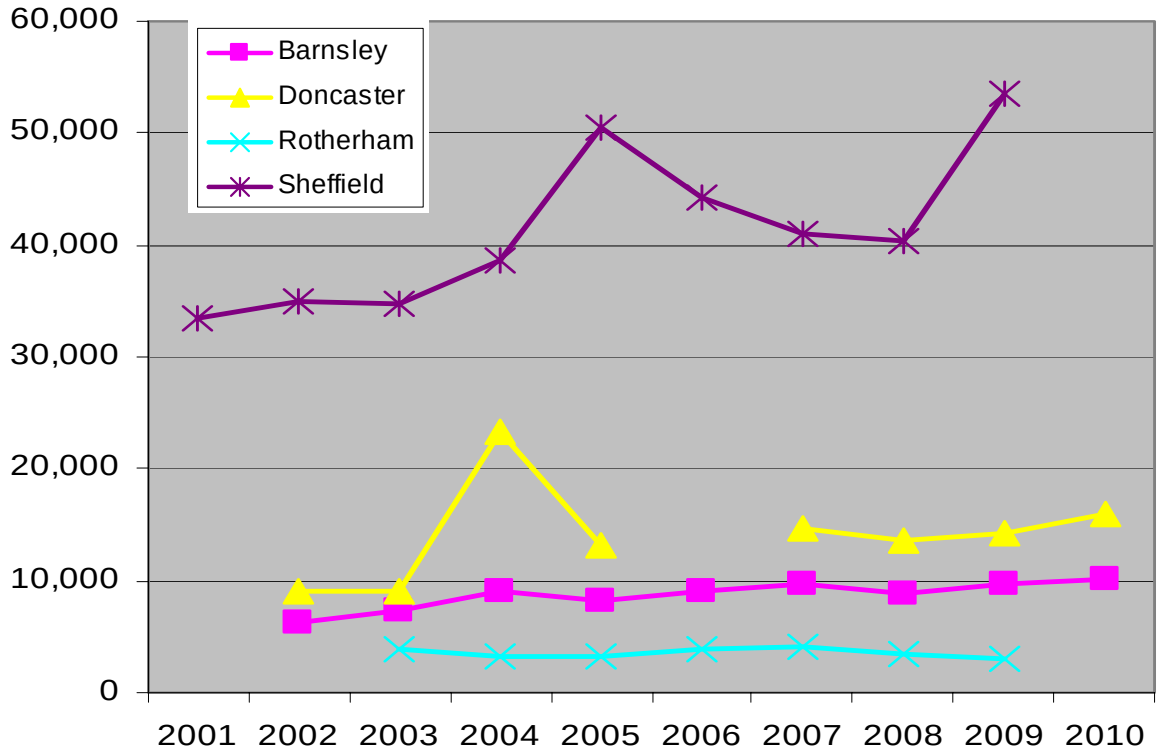
Source: SYPTE, 2010

Walking and Cycling

3.29. The random nature of walking routes makes capturing the number of trips made and the changes over time, difficult, if not an impossible task. There is some data collected at key cordons in the city and town centres in South Yorkshire that provides an indication of the trends for the number of people travelling on foot. Figure 3-7 summarises the data available between 2001 and 2010.

3.30.

Figure 3-7 Annualised Walking Trips in South Yorkshire

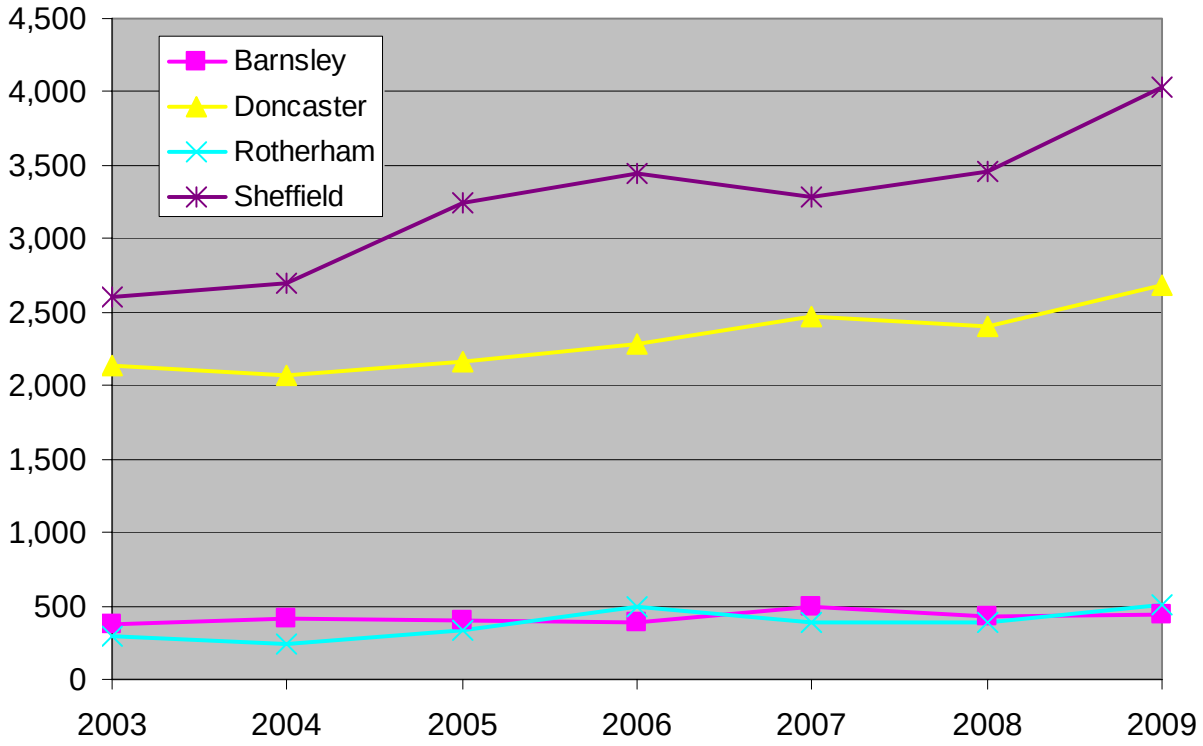


Source: SYPTE, 2011

3.31. Figure 3-7 shows that there has been an increase in the number of people walking in Barnsley, Doncaster and Sheffield. Rotherham has experienced a slight decline on these cordon counts. The data collected in Sheffield shows a significant drop in 2005 and then increasing again in 2009. This could relate to construction and regeneration work that has taken place in the city. This could also be the case in Doncaster which shows a significant fall in numbers in 2004 before a gap in the data.

3.32. The number of cycling trips in South Yorkshire has been growing steadily since 2003. A near 30% increase in cycle use has been recorded between 2003 and 2009. Figure 3-8 provides a breakdown of cycling trips by the four districts in South Yorkshire.

Figure 3-8 Annualised Cycle Trips in South Yorkshire



3.33.

Source: SYPTE, 2010

3.34. Figure 3-8 shows that Sheffield and Doncaster have seen the biggest increase in the number of cycling trips during 2003 and 2009. Rotherham and Barnsley have both experienced some increase in cycle trips over the period shown. The information provided here suggests that the effort that has been made to increase cycling has had some impact, but more effort is needed to encourage use of this mode.

4. Patterns of Travel

Introduction

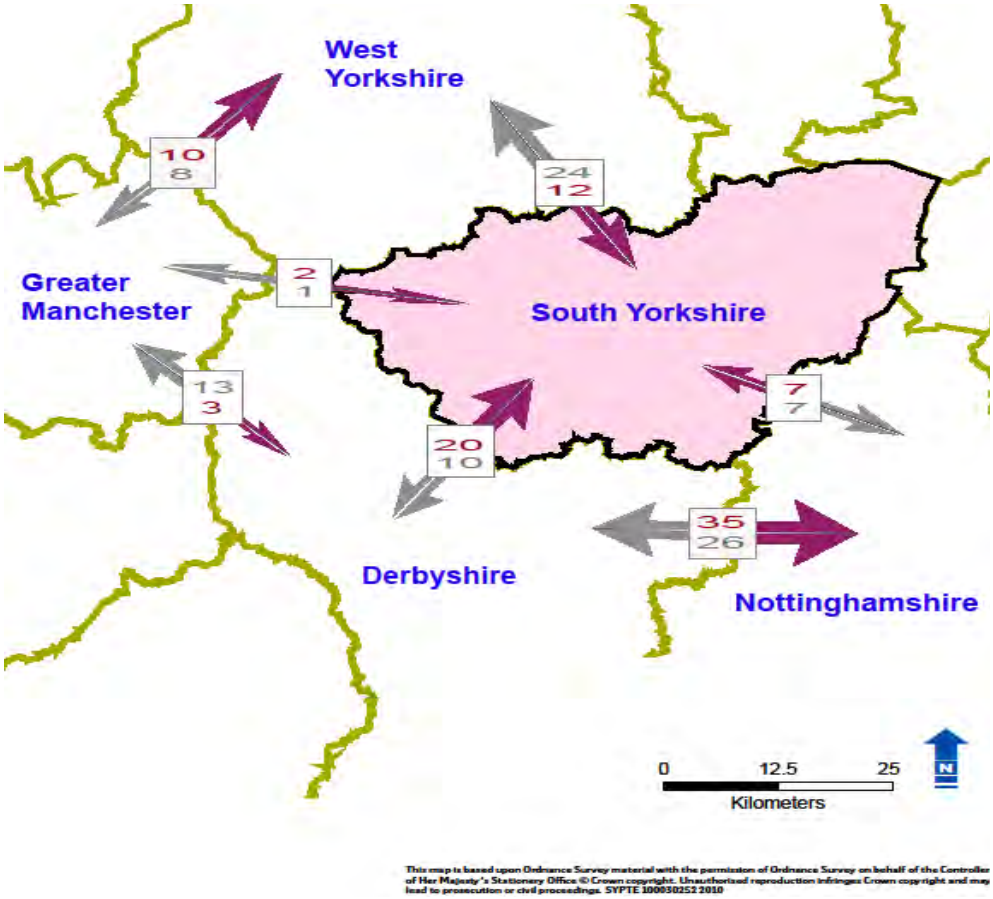
4.1. This chapter describes the demands on the transport network in the SCR. The information presented starts by describing commuting patterns in South Yorkshire and the SCR then moves on to highlight the demand from leisure trips. This chapter also describes freight movements in the Yorkshire and Humber region.

Commuting

Inter-Regional Travel Demand

4.2. National and regional links were described earlier in this document. Figure 4-1 shows the strength of movements between the metropolitan areas forming the basis of three of the four northern city regions, Derbyshire and Nottinghamshire. It should be noted that the data is from Census 2001 and covers travel for work purposes.

Figure 4-1 Daily Movements to Work between the Metropolitan Areas ('000s)



Source: National Statistics (Nomis: www.nomisweb.co.uk) Crown copyright material is reproduced with the permission of the Controller Office of Public Sector Information (OPSI). Census, 2001

4.3. Figure 4-1 shows that the highest level of movement between South Yorkshire and West Yorkshire (36,000) is double than that between Greater Manchester and West Yorkshire (18,000) and around twelve times that between Greater Manchester and South Yorkshire (3,000). The numbers of these movements may be influenced negatively by distance and topography (cross Pennine movements) and positively by smaller journeys between the settlements near the West and South Yorkshire boundaries.

4.4. Derbyshire produces the highest level of movements for work purposes to its neighbouring metropolitan areas, around 20,000 movements to South Yorkshire, 35,000 to Nottinghamshire, and 13,000 to Greater Manchester. The movements to Derbyshire from Nottinghamshire, South Yorkshire and Greater Manchester are nearly 26,000, 10,000 and 3,000 respectively.

SCR and Surrounding Counties Travel Demand

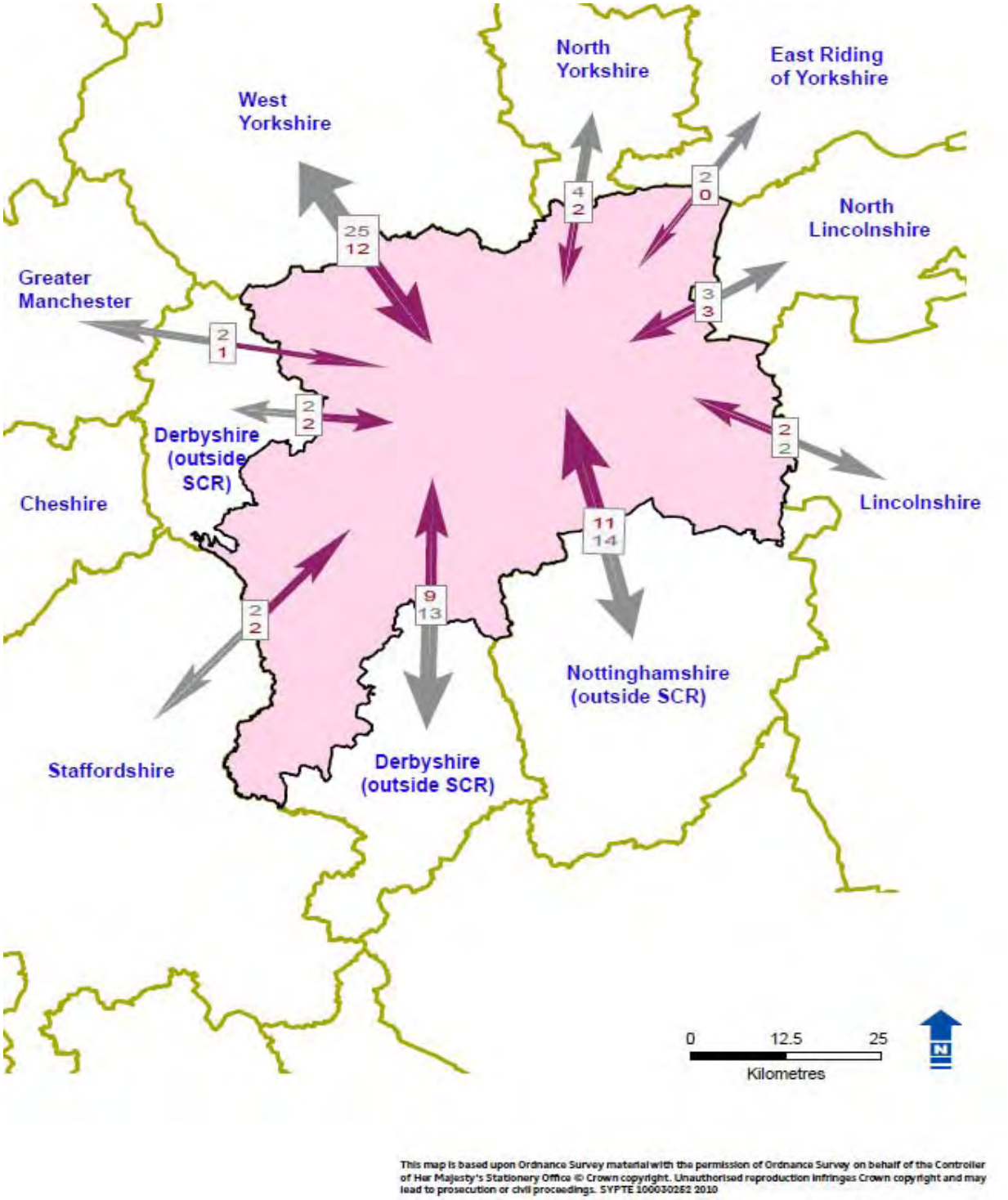
4.5. Previous section demonstrates the inter-regional travel demand. Since our Transport Strategy cover the SCR area so it is critical to look at the level of movements coming into and going out of the SCR area. In addition, it is important to note that over 90% of workers in SCR commute within SCR boundaries

4.6. Figure 4-2 shows the strength of movements between SCR and the neighbouring metropolitan and shire counties. Again, the data is from Census 2001 and covers travel for work purposes.

4.7. Figure 4-2 shows that the highest level of movement (36,000) between SCR and West Yorkshire is followed by 25,000 between SCR and rest of SCR in Nottinghamshire. The next highest level of movement of 22,000 is observed between SCR and rest of SCR in Derbyshire. This shows the high level of movement between SCR to West Yorkshire again, but also rest of the SCR area in Derbyshire and Nottinghamshire.

4.8. Analysis has shown that cross-boundary travel to centres other than Sheffield is also important. For example, a total of 7,587 journeys to work trips were recorded from West Yorkshire to the neighbouring districts of Barnsley and Doncaster, which account for approximately 60% of total trips from West Yorkshire to South Yorkshire. It is important to note that trips between Leeds and Sheffield City Regions are not necessarily between the main cities of those regions. This may indicate trips between the towns in the south of West Yorkshire, such as Hemsworth and South Kirkby which are roughly equidistant from Wakefield, Barnsley and Doncaster, and from where residents may commute to and from Barnsley and Doncaster. Similarly movements into Rotherham from outside of South Yorkshire are focussed on local trips from adjacent areas of Nottinghamshire.

Figure 4-2 Daily Movements to Work between SCR and Surrounding Counties ('000s)



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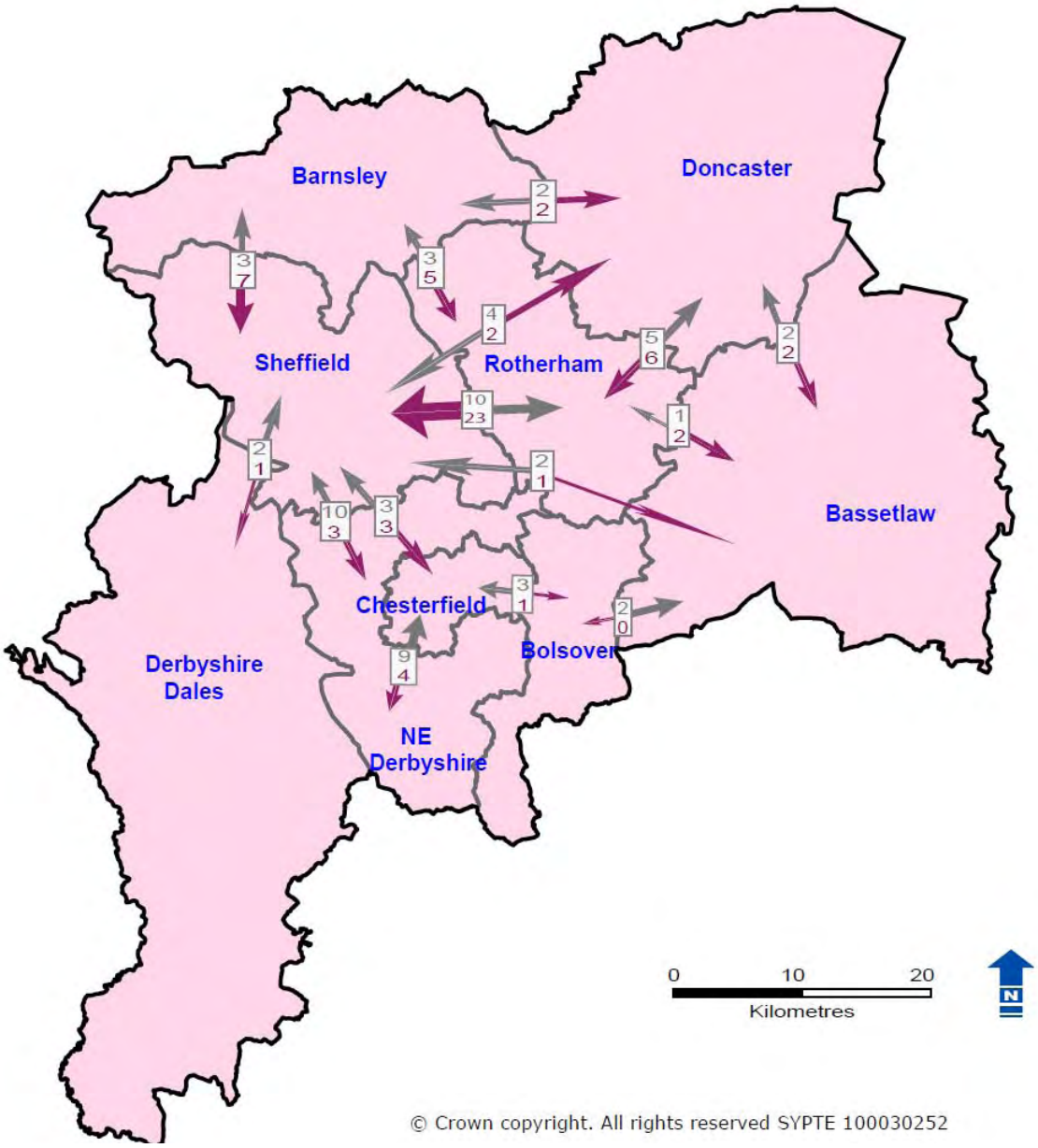
District to District Travel Demand within SCR

4.9. Journey to work trip levels between districts in SCR are indicated in Figure 4-3. The majority of journeys to work remain within one district, although there are still significant district-to-district flows within South Yorkshire and wider SCR districts.

Figure 4-3 Daily Movements to Work between the SCR Districts ('000s)



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4.10. Figure 4-3 highlights the large number of trips into Sheffield, with approximately 50,000 trips each day from the other SCR districts, and nearly 34,000 of these from the three other South Yorkshire districts. The vast majority of these SY trips originate in

Rotherham, with the smallest flows from Doncaster. Rotherham attracts more than 22,000 journeys to work trips per day from the other SCR authorities, with Doncaster attracting nearly 11,000 and Barnsley fewer than 10,000 trips per day. The only centre in SCR to have a net in-flow of journeys to work is Sheffield, with 50,000 trips attracted and 34,000 journeys to work trips leaving the district.

4.11. Significant travel to work flows exists between Sheffield and Rotherham. Sheffield is the larger centre, and provides 248,000 jobs compared to only 99,400 in Rotherham, there are significant flows in both directions. Approximately 23,000 daily trips are recorded towards Sheffield and 10,000 daily trips are recorded towards Rotherham.

4.12. Other important movements in South Yorkshire are between Rotherham and Doncaster, with 5,000 trips per day towards Doncaster and 6,000 trips towards Rotherham. Trips between Barnsley and Rotherham and Barnsley and Sheffield are heavily weighted away from Barnsley, with 7,000 trips per day towards Sheffield and 5,000 trips per day towards Rotherham.

4.13. Within the wider SCR districts, North East Derbyshire has an outbound daily work flow of 10,000 and 9,000 to Sheffield and Chesterfield respectively. These are significantly more than the inbound work flows of only 3,000 from Sheffield and 4,000 from Chesterfield.

4.14. Within the wider SCR districts, Chesterfield attracts more than 15,000 daily trips and generates around 8,000 daily trips.

Movements within District

4.15. The Northern Way commissioned a series of city relationship case studies[7]. The Sheffield case study highlighted the local economy and compared it with other regional centres, such as Manchester and Leeds.

4.16. Sheffield was defined in this study as a 'self-contained city'. A total of 85% of its residents both live and work within the city, and take 71% of total jobs within Sheffield. This can be compared to Manchester, which lies at the centre of the Greater Manchester conurbation, where 73% of residents live and work within the city, and take only 31% of total jobs.

4.17. The dependency of other towns in the SCR on Sheffield was also investigated. This found that a number of areas, including Barnsley and North East Derbyshire, are to certain degrees dependent on Sheffield for employment. Other centres, such as Rotherham, can be defined as being inter-dependent with Sheffield, in that the local job markets overlap and attract employees from both centres. Centres further from Sheffield, such as Doncaster and Bolsover are almost wholly independent from Sheffield in terms of employment catchments.

4.18. This emphasises the importance of not just considering strategic movements, but the impact of the SCR Transport Strategy on intra-district movements. Modal share also highlights this, with a high proportion of walking and cycling trips in all four districts in South Yorkshire, These trips are likely to be shorter and occurring within one district. Walking accounts for between 7% and 11% of all journeys to work, whilst cycling accounts for between 0.8% and 3%, as shown in Table 3-1.

4.19. Cordon counts are available for the urban centres in South Yorkshire[8]. These indicate the following number of vehicles crossing the central cordons in the morning peak in 2009:

[7] City Relationships Case Studies – Sheffield City Region Draft (Northern Way)

- Barnsley 19,500 car occupants, 4,800 bus journeys
- Doncaster 23,020 car occupants, 7,400 bus journeys
- Rotherham 18,000 car occupants, 5,355 bus journeys
- Sheffield 42,000 car occupants, 18,700 bus journeys

4.20. In Sheffield the main car flows across the central cordon were recorded on the A6135 / A6178 Wicker, A57 Sheffield Parkway, A61 Penistone Road, A621 Bramall Lane and A625 Ecclesall Road. In terms of bus flows the main routes across the cordon are the A6135 / A6178 Wicker, A621 Eyre Street and A57 Glossop Road. This highlights the importance of a small number of routes, where flows are concentrated into the central area. The Wicker, Penistone Road and Sheffield Parkway lead to routes from Rotherham, Barnsley and the M1, whilst Ecclesall Road and Bramall Lane lead to routes towards the southwest, generally serving the suburban areas of Sheffield.

4.21. In other urban centres of South Yorkshire, bus passenger flows on specific corridors are generally lower than in Sheffield. Important routes with high numbers of bus passengers are Eldon Street North and A61 Sheffield Road in Barnsley, the A630 Balby Road and North Bridge Road in Doncaster and the A633 St Ann's Road and A6021 Wellgate in Rotherham.

4.22. Other routes which see high levels of car flows across the central cordons are the A61 Old Mill Lane, A628 Pontefract Road, A628 Dodworth Road and A635 Doncaster Road in Barnsley, North Bridge Road, A630 Church Way and A638 Trafford Way in Doncaster and the A629 New Wortley Road in Rotherham.

Leisure Trips

4.23. It is important to recognise that over 50% of trips are not for work, study or business purposes, i.e. they are trips for shopping, visiting friends, sports and entertainment. Leisure is also the fastest-growing trip purpose; hence our strategy must address the needs of 'leisure' travellers.

4.24. The available data on leisure trips is limited. However research by Acxiom, as part of the SCR Strategic Economic Assessment (SEA), identified 61 retail centres in the SCR. The study identified that over half of these have a customer base composed entirely (100%) from SCR itself. Furthermore, more than half the customers of Ashbourne (57%), Bramley (64%) and the Alfreton Designer Outlet (78%) retail centres are residents from outside of SCR.

4.25. The SEA identifies that eighty-two percent (636,000 households) of all SCR households shop within the boundary. This leaves 143,700 who shop outside SCR, while 105,100 households travel in to shop. The net loss of 38,500 households is an economic leakage to the city region and an injection into surrounding areas.

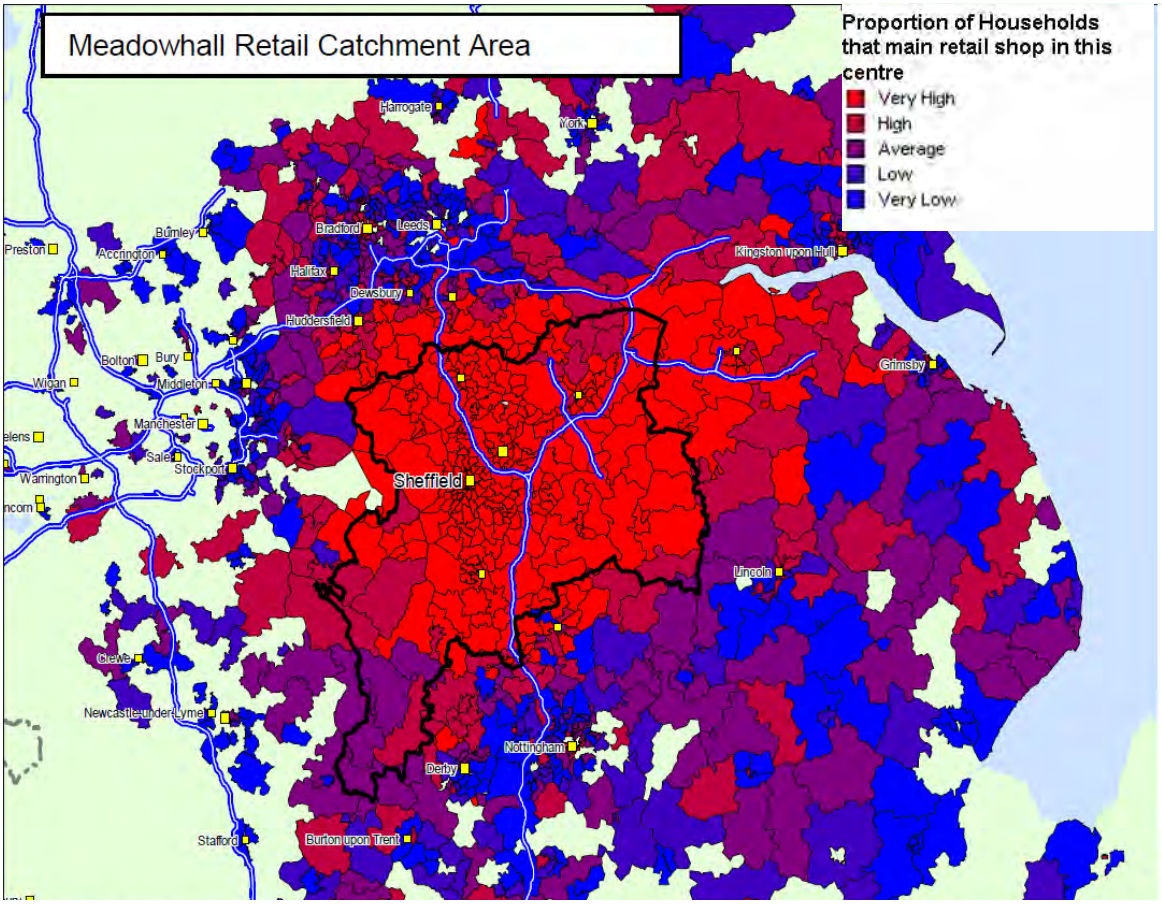
4.26. In order of preference the top 10 centres households choose to shop outside of the SCR are Mansfield, Derby, Leeds Central, Nottingham Central, Manchester Central, Lincoln, Buxton, Alfreton, York and Wakefield.

4.27. Meadowhall is Sheffield's largest shopping complex and has a wide catchment area and particularly significant pulling power on SCR shoppers. Meadowhall attracts nearly 20 million visitors a year of which 21% travel from outside the SCR. Of the 105,000 who

[8] All figures are reported in Sheffield City Region DaSTS Connectivity Study (Arup / Sheffield City Region Partners, January 2010)

travel from outside to shop in all City Region shopping centres 43% (47,800 households) go to Meadowhall. Figure 4-4 shows the retail catchments of Meadowhall.

Figure 4-4 Meadowhall Retail Catchments Area

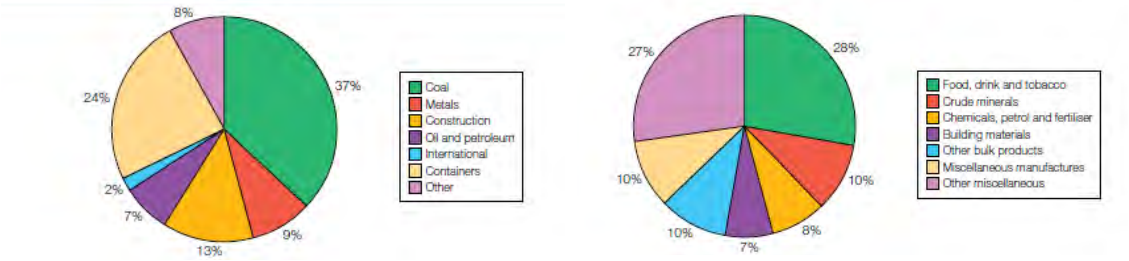


Source: Acxiom, 2009

Freight Movements

4.28. Freight in the SCR is carried by road, rail and inland waterways. A variety of rail freight cargos are carried, most of which includes coal, aggregates, metals, petroleum and intermodal (container) traffic. Road is by far the dominant carrier of freight in the UK with rail's share of the freight market around 12%. This is despite the Yorkshire and Humber area containing some of the busiest rail freight corridors in the UK. The types of goods moved by road and rail are identified in Figure 4-5.

Figure 4-5 Goods Moved in the UK by Rail (left) and Road (right) in Billion Tonne KM, 2007



Source: Office of Rail Regulation, National Rail Trends, 2008, and DfT, Transport Statistics, Road Freight Statistics, 2007

4.29. The charts in Figure 4-5 show that the movement of coal dominates rail freight, followed by construction material. Food, drink and tobacco movements dominate freight movements by road closely followed by the movement of other miscellaneous goods. Goods lifted by origin and destination are shown in Figure 4-6.

4.30. Figure 4-6 shows that 70% of freight movements in Yorkshire and Humber are within the region. Yorkshire and Humber has the most goods lived by origin in Great Britain (216 million tonnes). Likewise Yorkshire and Humber is the region with the most goods lifted by destination (204 million tonnes). The majority of movements to and from the region are to the North East and North West.

4.31. In terms of vehicle numbers it is estimated that there are 50,000 lorry movements to the SCR each day, with an additional 5,000 lorry movements per day passing through the region[9]. The introduction of 44 tonne lorries and "Just in Time Delivery" procedures may continue to see a growth in the number of tonnes moved by road.

4.32. Road freight results in a number of issues in both rural and urban areas. Rural issues include the suitability of routes for freight vehicles; this can cause community severance and restrictions can be enforced to prevent this resulting in lengthy diversions. In urban areas noise and air quality are major issues.

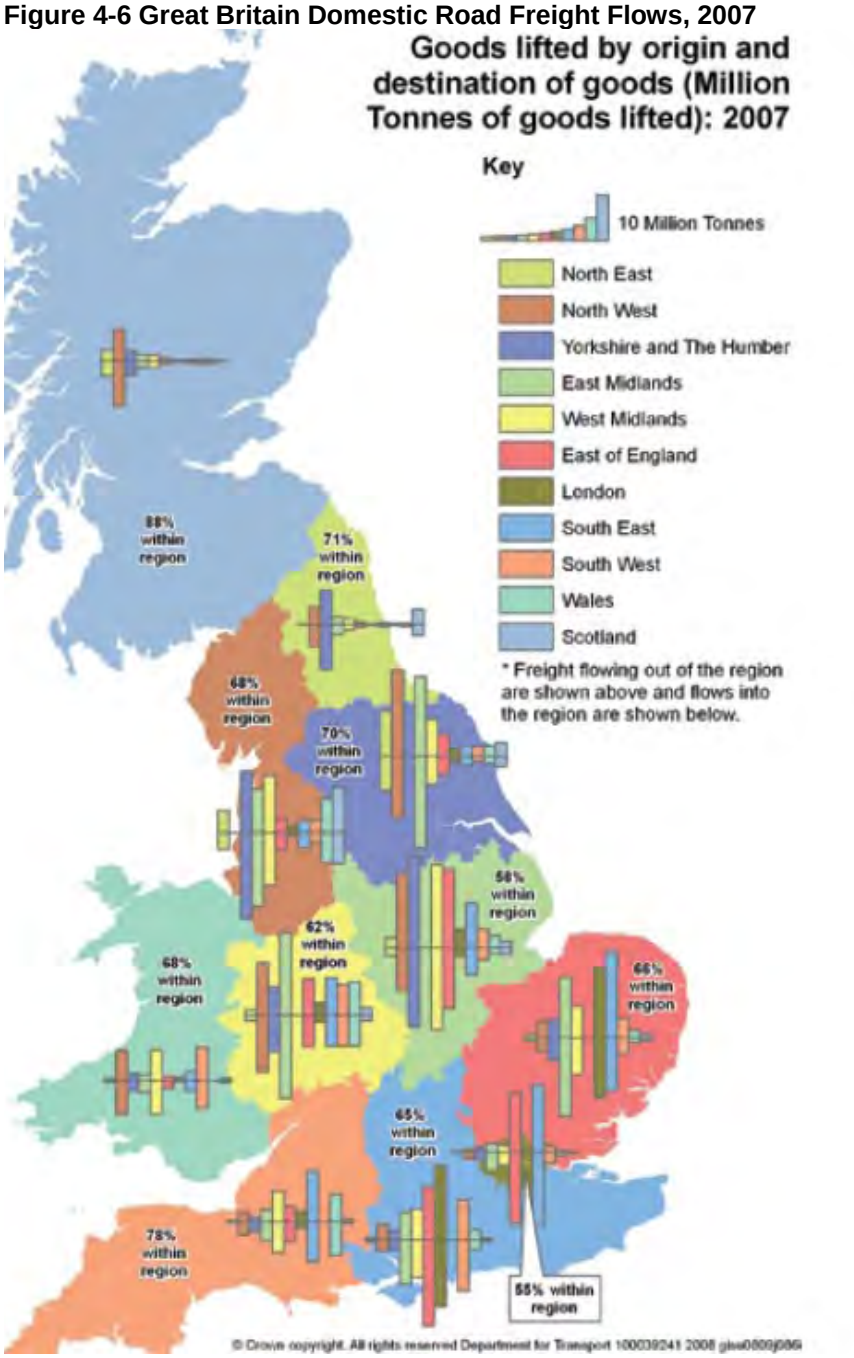
4.33. Freight to and from Immingham is a major source of rail traffic in the SCR. The main routes towards Immingham run through Doncaster, either across or along the East Coast Main Line, with 40-49 trains per day through Thorne Junction. This route has a loading gauge W8 and carries a high-demand of coal. Other important routes for freight are:

- Rotherham – Chesterfield via Eckington (loading gauge W6), carrying coal and metals, containers and lime (30-40 trains per day)
- Swinton – Moorthorpe via Thurnscoe (loading gauge W8/9), carrying coal to surrounding power stations (up to four trains per day)
- Sheffield – Manchester via Hope Valley (loading gauge W7), carrying limestone, cement and coal (5-10 trains per day).

[9] Sheffield City Region DaSTS Connectivity Study, Baseline Report (January 2010)

4.34. It is estimated that an additional 10-15 trains will use the Immingham – Doncaster route by 2014-15. Significant barriers to rail freight growth from 2004 to 2014 have been identified along the Hope Valley line, in particular the short section of single track through Dore station to the south of Sheffield[10].

Figure 4-6 Great Britain Domestic Road Freight Flows, 2007



Source: DfT Road Freight Statistics, 2007

[10] Network Rail, Yorkshire and Humber Route Utilisation Strategy (July 2009)

5. Performance

Introduction

5.1. This chapter presents some of headline network performance issues at 'national', 'strategic' and 'local' levels. More detailed analysis on forecasting of the performance is presented in Document 3: Forecasting, with further information provided in Document 5: Supporting Economic Growth.

National Network

The Road Network

5.2. North-South links are high capacity and reasonably quick. They carry large quantities of traffic through the SCR, which does not stop there. Although the SCR benefits from being placed on these key strategic north-south links, traffic growth is eroding the reliability of the network. This existing situation will worsen as economic growth increases trip making in the SCR (and between other city regions).

5.3. Extremely serious traffic is caused in the SCR on occasions when either the M1 or A1 closes (due to adverse weather, accidents or other events) and long distance traffic is routed onto diversionary routes through the urban areas.

5.4. The evidence shows that the national network suffers from particular 'stress' points[11], particularly between M1 junctions 31-32, 34S-34N-35, 35A-36, and on stretches of the A616 during peak periods.

5.5. The A57 and A628 are primarily single carriageway conventional roads with sections of constrained alignment and steep gradients. They are subject to congestion at Tintwistle and Glossop and can be closed during adverse weather conditions. In consequence, much east-west road traffic from the SCR travels north and crosses the Pennines using the M62.

5.6. The road links to the west (the A57 Snake Pass and A628 Woodhead Pass) are also slow (single carriageway roads with a general 50mph limit, but localised lower speed limits) and subject to closure when there is snow on the ground. The poor links imply that the link to Manchester Airport from the SCR is also poor.

The Rail Network

5.7. The recent timetable change on the Midland Main Line is welcomed, because this has delivered a half-hourly service from Sheffield to London and improved journey time. Nonetheless, line speeds on the Midland Main Line are lower than those on the East Coast, West Coast and Great Western Main Lines and all trains are operated using diesel locomotives, adding to CO_2 and particulate emissions in Sheffield City Centre, which is part of the wider Air Quality Management Area (AQMA) covering the whole of the Sheffield urban area[12]. It is estimated that the section of route from Dore through Sheffield to Meadowhall generate at least 1,000 tonnes of CO_2 per annum[13].

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[11] Highways Agency Network Analysis Tool – 'stress' is demand as a % of capacity. SCR Partners (2010) DaSTS Connectivity Study Baseline Report p36

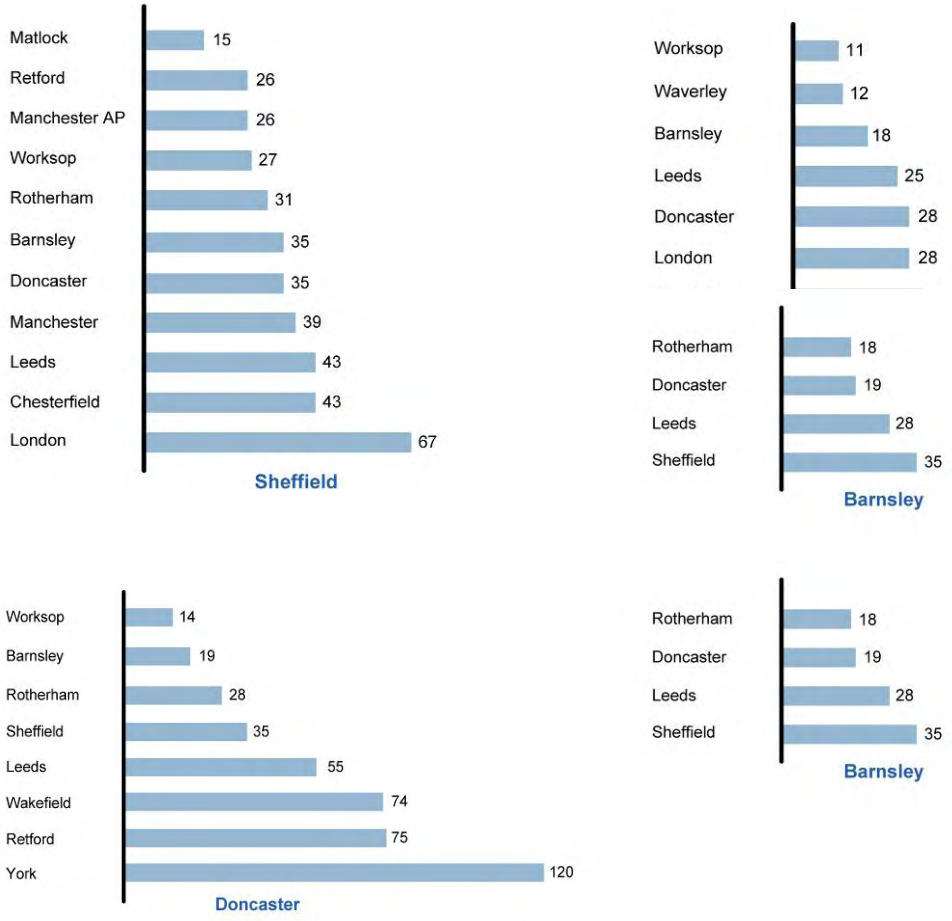
[12] Air Quality Progress Report, Sheffield City Council (August 2008)

[13] Yorkshire and Humber DaSTS Databook

5.8. The rail service pattern reflects the compromise between serving through bulk freight trains, express trains and local stopping services on the same lines. This results in slow rail speeds and is felt throughout the City Region, but perhaps most significantly through the rail capacity issues on the Hope Valley line to Manchester, and the onward Sheffield–Rotherham-Leeds line.

5.9. The figure below shows journey times by public transport between South Yorkshire towns and other destinations.

Figure 5-1 Public Transport Average Speed from South Yorkshire to Destinations Centres (mph)



Source: SYPTE / Mott MacDonald, 2009

5.10. The figure above shows Rotherham and Barnsley have the slowest links whilst Doncaster and Sheffield have the fastest in South Yorkshire. In general, links within the SCR are slower than those to other destinations outside the SCR and London.

5.11. Figure 5-1 depicts that public transport speeds to areas outside the SCR are generally slow, with only Sheffield to London and the routes from Doncaster on the East Coast Mainline having average speeds of greater than 60mph. In an analysis of journeys from London to regional towns and cities outside of the southeast, Doncaster recorded the

fourth fastest journey speed (90mph), with an average journey time of 1 hour and 44 minutes[14].

5.12. From Sheffield, speeds are typically slower and journey times therefore longer. The journey between Sheffield and London in 2008 was recorded as the fourth slowest of those journeys analysed[15] (out of a total number of 15), with an average speed of 78mph, and a journey time of 2 hours 10 minutes. This is slow compared to journeys between London and other city regions, for example Manchester (speed 86mph – time 2 hours 9 minutes) and Liverpool (speed 86mph – time 2 hours 15 minutes) both having similar journey times as London to Sheffield, despite the additional journey distances of 17 miles between London and Manchester and 27 miles between London and Liverpool.

5.13. The rail link to the west is along the Hope Valley Line, which links Manchester and Sheffield. This route is also constrained by challenging topography and the single line section through Dore and Totley station. The journey time to Manchester is also slow in absolute terms (66 minutes at 39 mph), although it is faster than the alternative road time for travel between the city centres.

5.14. Holmes Chord and Swinton are two locations causing significant reactionary delays. Holmes Chord contains a single line section and this infrastructure is causing delays and a source of congestion. Substantial reactionary delays occur at Swinton due to several lines converging, and the services passing through here originating and terminating over a wide geographical area. As rail traffic grows, so will congestion at this junction.

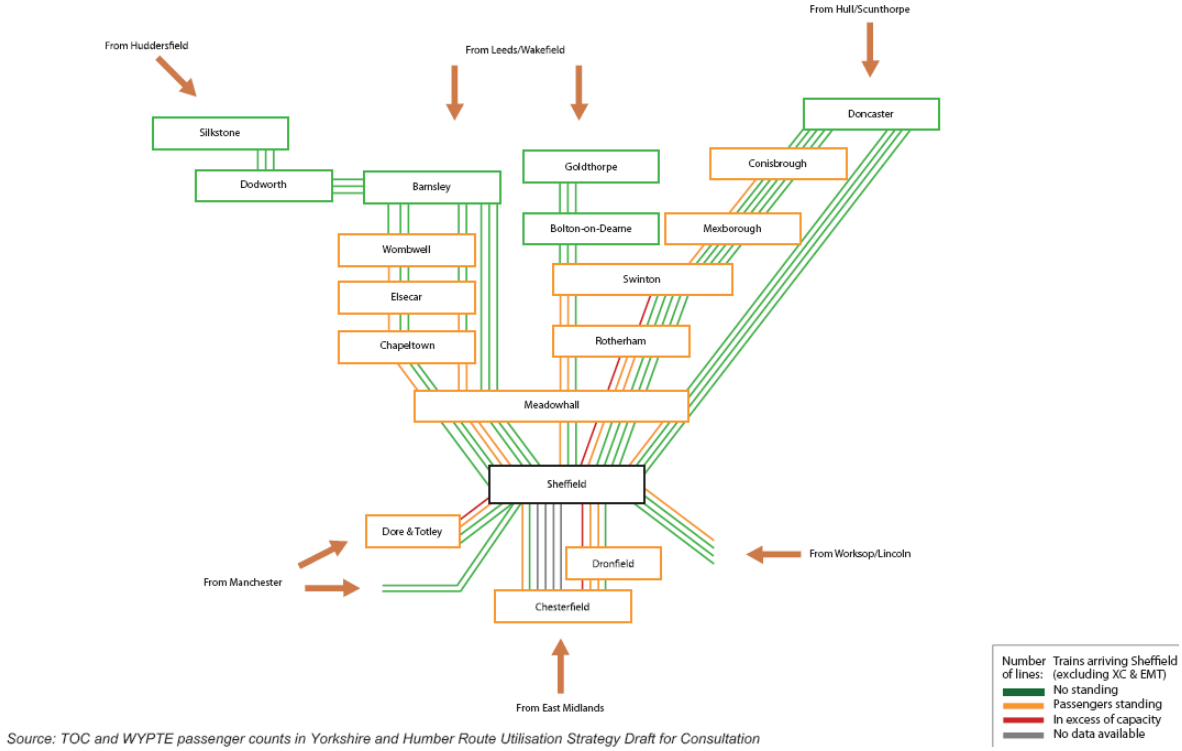
5.15. Overcrowding on rail services is increasing, and is expected to occur on more and more services in the coming future, as the popularity of rail increases but train capacity fails to keep pace. Even during the recession rail patronage has continued to grow; therefore, the networks serving SCR are under stress.

5.16. As can be seen from Figure 5-2, some trains are currently operating in excess of capacity at the Chesterfield-Dronfield-Sheffield corridor, Dore and Totley-Sheffield corridor, and Swinton-Rotherham-Sheffield corridor. Passengers currently have to stand on nearly all of the lines into Sheffield during the morning peak.

[14] A comparison of relative rail services from London, SYPTE (December 2008)

[15] Ibid

Figure 5-2 Crowding Levels on Trains into Sheffield (0700-0959hrs)



Source: TOC and WYPTE passenger counts in Yorkshire and Humber Route Utilisation Strategy Draft for Consultation

Source: Yorkshire and the Humber RUS, cited by Yorkshire Forward

Strategic Network

Strategic Road Network

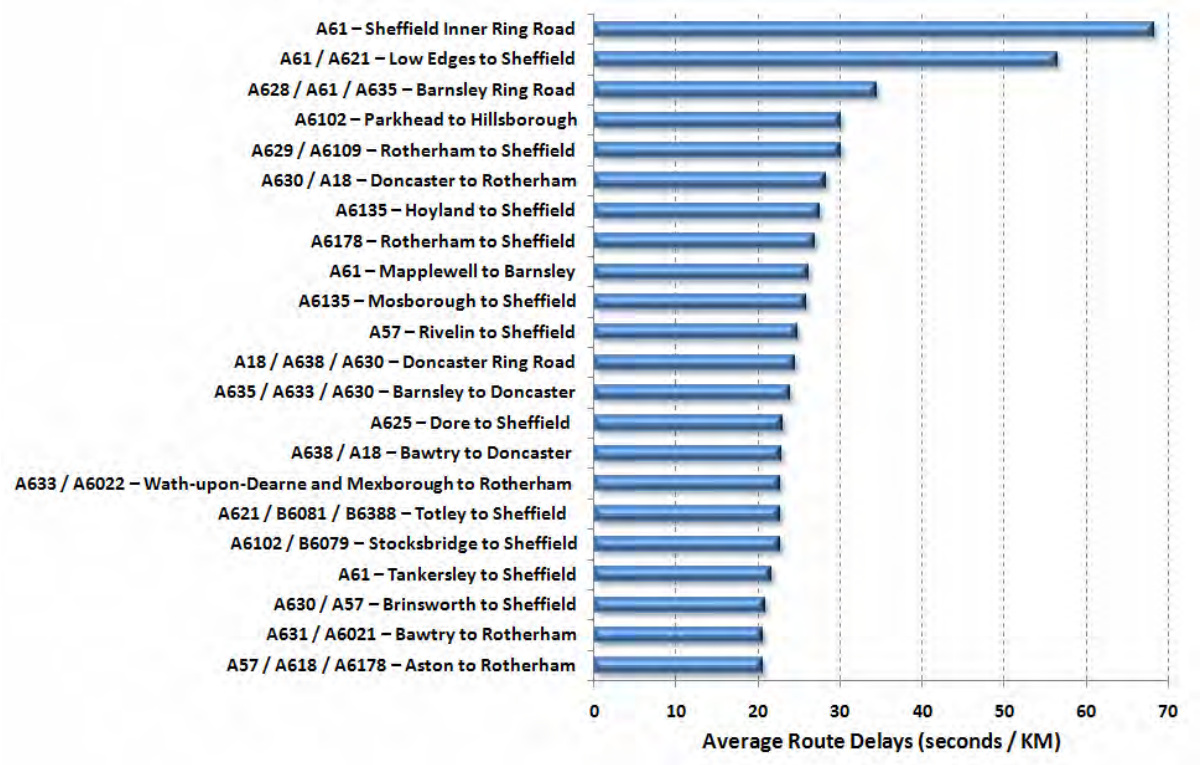
5.17. Although there are good road linkages between the key towns in SCR, key routes into and out of the larger centres suffer from severe congestion. This includes the following:

- A61 into Sheffield (north from Barnsley and south from Chesterfield)
- A621 from Dore
- A57 into Sheffield
- A628 into Barnsley
- A633, and A630 into Rotherham
- A61 to Wakefield
- A638 and A630 into Doncaster.

5.18. During peak periods there are extensive delays on most radial routes, such as stretches of the A616. Places where through traffic joins local commuting flows experience delays. Figure 5-3 shows seconds of delay per kilometer during the morning peak on some of SCR's busiest roads.

5.19. The strategic network in Sheffield, Rotherham, Chesterfield and Barnsley is vulnerable to congestion and diversion from the M1. Similar issues occur in Doncaster, if the A1(M) and the M18 is either congested or closed due to works or incidents.

Figure 5-3 Delays on Strategic Road Networks



Source: LTP Partnership Trafficmaster data, 2011

5.20. Our analysis shows that travel times at peak periods can be over 30% greater than off-peak[16], and that traffic across SCR is rising faster than the national average[17].

5.21. Public satisfaction surveys showed that under 40% of users are satisfied with highway condition across SCR[18]. Further market research[19] revealed that 80% of respondents felt that the major priorities for improvement were to tackle traffic congestion and also to improve the condition of roads and pavements.

5.22. Maintenance is currently prioritised in line with available funding, taking into account the increasing traffic volumes, wear and tear, and the importance of strategic routes. This ultimately leaves limited funding available for the local network, resulting in a worsening condition.

5.23. Poor network resilience is evident in cases of extreme weather, such as snow, floods, heat and drought[20]. For example, the 2007 floods caused £10 million of additional damage to the Sheffield road network. The contingency process required in case of road closure, either weather related or other, requires stronger coordination.

[16] LTP Partnership Trafficmaster data.
[17] Car vehicle km increased 4.1% between 2003 and 2008, compared to national increase in same period of 3.8% - Evidence base document 'Networks', Table 3-3 on page 28.
[18] National Highways & Transport Network, The 2009 Public Satisfaction Survey.
[19] IPSOS MORI, The 2008 People, Prceptions and Place Survey.
[20] Department for Environment, Food Rural Affairs, (2010), The Costs of the ummer 2007 Floods in England

Strategic Public Transport Network

5.24. On the tram in Sheffield, there is also significant overcrowding at peak periods. Recent market research[21] for additional trams highlighted that almost one respondent in three (29%) indicated that they experience difficulty boarding services at least 25% of the time, whilst the majority (69%) experience difficulties at least occasionally. It was assessed that, on a typical day, 1.3% of passengers in the morning peak and 0.5% of passengers in the evening peak were unable to board the first tram which arrived at their stop.

5.25. Tram patronage has risen steadily from 1999, although patronage levelled off in 2008/09, probably due to the recession, can be seen in Figure 3-3.

5.26. The bus network suffers less from overcrowding, even if some services, especially on the A61 corridor, are often overcrowded[22]. Rather, the challenge is helping buses run reliably and punctually. This is the key point of customer dissatisfaction with bus services[23].

5.27. Buses tend to get caught in congestion pinchpoints on key routes. Routes where bus journey times are worsening[24] include those which serve the following:

- Barnsley to Penistone;
- Barnsley to Chapeltown;
- Doncaster Balby Road;
- Sheffield Attercliffe;
- Sheffield Brightside; and
- Sheffield Sheaf Valley.

Local Network

5.28. There is limited evidence to show the performance of the local network. The size and complexity of this network would make it almost impossible to assess. Therefore, on-going monitoring of the network is likely to remain at the strategic level.

5.29. The local network supports the majority of the cycling and walking network. Sheffield City Region has improved this element of the local network, but it still is in its early stages of development. The network does include key routes such as the Trans-Pennine trail, in part built on the disused rail alignments, and local cycle route networks in Sheffield, Doncaster and Barnsley.

21 Annex E MSBC for Additional Trams, SYPTE unpublished.

[22] SCR Partners (2010) Sheffield City Region DaSTS Connectivity Study Baseline.

[23]. Passenger Focus (2010) Bus passenger priorities for improvement p11 www.passengerfocus.org.uk/news-and-publications/

[24] Bus KPI report, SY Public Transport Board, April 2010- where bus travel times worsened since 2006 by over 20%

6. Assets

Introduction

6.1. This chapter describes our existing assets and the ways by which we manage them. The information provided in this chapter relates to assets in South Yorkshire and includes a breakdown of the assets by type.

Contribution to the Strategy

6.2. The effective upkeep, condition and maintenance of highway assets (including roads, footways, Rights of Way, street lighting, signage, traffic signals, structures and drainage) underpin the achievement of our goals. Well maintained and managed highways contribute to the delivery of reliable public transport, promotion of social inclusion and reduce the impact on the natural and built environment. Highway maintenance undertaken with modern surfacing materials can also reduce traffic noise and improve safety.

6.3. Highways asset management forms a prominent expenditure element of the transport block allocation. The increasing pressure on budgets means that more attention should be given to an efficient and productive use of available resources and existing infrastructure.

Highway Assets

6.4. South Yorkshire's road network (excluding motorways and trunk roads which are managed by the Highways Agency) comprises of 5,948 km of adopted roads, 1,706 km of which form the classified 'A', 'B' and 'C' road networks. Table 6-1 shows a breakdown of the road network by classification.

Table 6-1 Road Network Length in South Yorkshire by Road Classification (km)

Road Classification	Urban/ Rural	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Principal Road Network (A Roads)	Urban	56.1	81.2	60.1	102.0
	Rural	73.1	78.7	46.5	43.5
Classified Road Network (B Roads)	Urban	39.8	23.0	52.3	94.2
	Rural	33.9	30.1	43.0	6.6
Classified Road Network (C Roads)	Urban	59.3	98.6	88.4	235.2
	Rural	101.8	153.2	89.7	16.2
Unclassified Road Network (U Roads)	Urban	702.6	945.3	676.4	1344.9
	Rural	110.2	239.5	75.2	129.4
Green Lanes	Rural	N/A	7.8	N/A	10.0
Total		**1176.8**	**1,657.4**	**1131.6**	**1982.0**

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.5. The road network is also designated by hierarchy definition, as recommended and defined in the Code of Practice for Highways Maintenance Management "Well Maintained Highways" July 2005. The network hierarchy is the foundation of a coherent and auditable maintenance strategy, and governs the frequency of highway safety and serviceability inspections. Consequently it is important that the category assigned to each road reflects the needs, priorities and actual use of each road in the network. Table 6-2 shows the present distribution of the highway network by the hierarchy used in the Highway Asset Management Plan (HAMP).

Table 6-2 Road Network Length in South Yorkshire by HAMP Hierarchy (km)

Road Classification	Urban/ Rural	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
2-Strategic Route Principal A roads between primary destinations.	Urban	168	68.6	60.1	42.0
	Rural		47.8	46.5	3.6
3a-Main Distributor Route Major urban network and inter primary links carrying medium distance traffic.	Urban	395	74.1	22.9	60.0
	Rural		73.4	14.2	39.9
3b-Secondary Distributor Route Unclassified bus routes carrying local traffic with frontage access and frequent junctions.	Urban	29	62.0	170.6	329.4
	Rural		138.9	113.4	22.8
4a-Link Road Routes Link roads between the main and secondary distributor routes.	Urban	191	171.6	86.8	341.3
	Rural		0	16.1	35.38
4b-Local Access Roads Serving limited numbers of properties and carrying only local traffic.	Urban	393	773.7	525.8	1003.6
	Rural		0	75.2	94.02
5-Rural Unclassified Roads These are rural unclassified roads which are paved and also include un-paved roads defined as 'Green Lanes'.	Urban	Included above	0	n/a	0
	Rural		247.3	Included in 4b above	10.0
Total		**1176**	**1657.4**	**1131.6**	**1982.0**

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

Footway Network

6.6. The footway network is maintained within each authority's Asset Management System and is designated by the DfT 'Footway Hierarchy' for maintenance purposes in accordance with the Highways Code of Practice "Well Maintained Highways". Table 6-3 shows a breakdown of the footways network by hierarchy definition used in the HAMP.

Table 6-3 Footway Network Length in South Yorkshire by HAMP Hierarchy (km)

Road Classification	Urban/ Rural	Barnsley MBC[25]	Doncaster MBC	Rotherham MBC	Sheffield CC[26]
1a-Prestige Walking Zone Very busy areas of towns with high public space and street scene contribution	Urban	8.5	18	0	14 (Prestige)
	Rural		0	0	0
1-Primary Walking Route Busy urban shopping and business areas and main pedestrian routes	Urban	0.5	(incl with 1a)	6.4	382 (High-Usage)
	Rural		0	0	0
2-Secondary Walking Route Medium usage routes through local areas feeding into primary routes local shopping centres and large schools	Urban	36	50	91.9	0
	Rural		0	0	0
3-Link Footway Linking local access footways through urban areas and busy rural footways	Urban	183	263	1408.8	2729 (Low-Usage)
4-Local Access Footway Associated with low usage, short estate roads to the main routes and cul-de-sacs	Urban	948	1050	67.3	0
	Rural		158	41.5	0
Total		1176 (C/way KM)	1710	1667.0	2930

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

Public Rights of Way Network

6.7. Public Rights of Way (PROW) form part of the definitive highway network and so each highway authority has certain statutory duties relating to their protection and maintenance and the keeping of legal records. PROWS are usually maintained within the highways asset management system, although some councils within South Yorkshire may do so outside the main asset management system.

6.8. The Countryside and Rights of Way Act 2000 required highway authorities to prepare and publish a "Rights of Way Improvement Plan". This will be updated every ten years. The "Rights of Way Improvement Plan" must demonstrate and assess:

[25] BMBC are in the process of reviewing their footway inventory in line with the Asset Valuation Initiative therefore default road lengths have been used at this time to provide indicative measure/split of road category lengths.

[26] Sheffield no longer use COP categories, a new category of footways has been developed for the PFI which aligns with the COP as follows [1a = Prestige] [1&2 = High Usage] [3&4 = Low Usage]

- The extent to which local rights of way meet the present and likely future needs of the public;
- The opportunities provided by local rights of way for exercise, and other forms of outdoor recreation and the enjoyment of the authority's area; and
- The accessibility of local rights of way to blind or partially sighted persons and other users with mobility problems.

6.9. Table 6-4 shows a length (km) breakdown of the PROW by network type.

Table 6-4 Public Rights of Way Length (km)

Type	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Footpaths	561	380	323	632
Bridleways	133	97	75	94
By-ways	0	14	2	19
Restricted By-ways	4	1	1.5	2

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.10. The condition of South Yorkshire's public rights of way is assessed each year to produce the national performance indicator BVPI 178 – Ease of Use. The standard assessment methodology is to randomly select 5% of the network, by length, as a 'snap shot' of the condition of the network. The survey is carried out at different times throughout the year such as one part in spring and the other in autumn, to allow for differences caused by the weather and the farming year. The methodology used is that developed and recommended by the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) - formerly known as the County Surveyors Society (CSS) - and is approved by the Audit Commission.

Street Lighting

6.11. Under Section 97 of the Highways Act 1980, it is not mandatory for authorities to install street lighting, but once installed on adopted highways there is a responsibility for maintenance. The four South Yorkshire Councils are together responsible for the maintenance of approximately 180,000 street lighting units. These are generally maintained within each authority's asset Management System. Table 6-5 indicates the number of lamp columns which the councils are responsible for.

Table 6-5 Street Lighting Inventory for South Yorkshire

Authority	Number of lamp columns
Barnsley MBC	32500 (Estimate)
Doncaster MBC	46614
Rotherham MBC	37800
Sheffield MBC	65356

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.12. To support the management and capital renewal of lighting columns, South Yorkshire undertakes inspections of the structural condition and electrical components of the columns. Table 6-6 shows the number of lighting columns replaced through capital renewal.

Table 6-6 Lighting Columns Replaced through Capital Renewal in South Yorkshire

Year	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
2004/05	950	No Data	305	327
2005/06	1900	No Data	520	237
2006/07	2244	No Data	455	162
2007/08	1236	326	330	258
2008/09	1236	310	375	151

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.13. No national indicators exist to report the condition of the street lighting inventory to central government, although BVPI 215a (Rectification of Street Lighting Faults (non-DNO)) and BVPI 215b (Rectification of Street Lighting Faults (DNO)) represent established performance indicators.

Traffic Signs and Road Markings

6.14. South Yorkshire has a large stock of signs, fences and barriers. Table 6-7 shows the estimated number or length of these asset items.

Table 6-7 Traffic Signs Inventory for South Yorkshire

Inventory item	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Illuminated Signs	2983	unknown	3000	6278
Non-illuminated Signs	12000 (est)	15000 (est)	12000	24745
Illuminated Bollards	1098	1300	1300	1248
Non-illuminated Bollards	2500	unknown	6000	4235
Street Name Plates	15,000	unknown	8000	19000 est
Pedestrian Barriers	15km (est)	unknown	18km	25.8km
Vehicular Barriers	18km (est)	unknown	48km	17.1km
Other fences & barriers	Unknown	unknown	200km	94.7km
Red Light / Speed cameras	21 installations	10	25	29

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.15. Sign faces within South Yorkshire are replaced and maintained as part of a highway improvement programme or via complaints from members of the public. Table 6-8 indicates the number of sign renewals.

Table 6-8 Sign Renewals in South Yorkshire (Number)

Year	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
2004/05	No Data	No Data	No data	831
2005/06	No Data	No Data	No data	900
2006/07	120	350 (Est)	1392	1393
2007/08	151	363	1345	801
2008/09	100	342	1281	2303

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

Street Furniture and Highway Amenities

6.16. Street furniture and high amenity assets are potentially wide ranging and large in number. Table 6-9 shows those asset items which are on the highway network and which belong to and are maintained by the highway authority. The list in Table 6-9 is not exhaustive and the ownership status of the following street assets can vary between the South Yorkshire Councils. If the item listed is not considered by the individual authority to be a highways asset, then it is noted as "Non Highway".

Table 6-9 Street Furniture Inventory for South Yorkshire

Inventory item	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Litter and dog bins	Non Highway	Non Highway	2968	2400
Highway Seats	No data	No data	1200	No data
Cycle Racks	No data	No data	No data	No data
CCTV Installations	15	50	98	32
Monuments	Non Highway	No data	18	No data
Matrix & Car Park VMS	0	7	38	74
ANPR Cameras	25 (+16 programmed)	18	35	100

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.17. No performance indicator currently exists to monitor the condition of the street furniture inventory; however the clutter caused by a proliferation of street furniture can be a barrier to the disabled.

6.18. There are no regular condition surveys, although surveys of illuminated signs are conducted with the street lighting inspections. Signs are expected to perform satisfactorily for up to 10 years before they need replacing. It is envisaged that highway authorities will enter their signing inventory into the asset management system. Once this has been undertaken, it will be possible to establish condition performance indicators.

6.19. Road markings are generally renewed in association with highway structural maintenance schemes, e.g. resurfacing, or preventative maintenance programmes, e.g. surface dressing. In addition, routine inspections and customer complaints identify faded and worn road markings that are replaced as reactive works subject to budget constraints. There is no specific road marking inventory; hence there is no established performance indicator to monitor its condition.

6.20. Traffic Regulation Orders (TRO's) also contribute to the growing extent of new road markings, particularly yellow lines. In addition, road safety schemes and traffic calming projects make use of road markings and coloured surfacing to reflect local safety needs.

Traffic Signals and Pedestrian Crossings

6.21. Although this asset belongs to the individual authority it is usually maintained by an outside contractor and is linked to the South Yorkshire traffic management system. Table 6-10 provides the number of traffic signal installations and pedestrian crossing facilities located in each district.

Table 6-10 Traffic Signals Inventory for South Yorkshire

Type	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Traffic Signal Installations	51	85	44	292
Controlled Crossings	35	65	51	186
Uncontrolled Crossings (Zebra / Pelican)	13	30 (Est)	37	202
School Crossing Flashing Beacons	57	*No Data*	58	58

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

6.22. No performance indicator currently exists to monitor the condition of the traffic signals inventory. However, the Network Management Duty Guidance within the Traffic Management Act 2004 emphasises the need for authorities to establish systems for ensuring that the network and its infrastructure are well maintained and reviewed on a regular basis, with a well publicised reporting and repair process for road defects and equipment faults. This need is especially important for the traffic signals inventory. The adoption of performance indicators would facilitate the determination of a systematic traffic signal modernisation programme. This programme would minimise the likelihood of failure of equipment, which could result in extended loss of signal control at junctions and standalone pedestrian crossings (with consequent implications for road safety and journey time reliability), as well as ensuring that traffic signal installations are maintained to current standards.

Highway Structures

6.23. Highway structures are maintained by the Bridges & Structures Department in each authority, in accordance with the Code of Practice of Highway Structures, published in 2005.

6.24. These assets contribute to an integral part to the highway network. Table 6-11 lists the type and quantity of highway structures which exist within South Yorkshire.

6.25. Bridge condition is determined following a general Inspection and is rated using the County Surveyors Society (CSS) Bridge Condition Index. The condition indicators for an individual bridge (BCI) or a stock of bridges (BSCI) are evaluated using the data collected during the bridge inspections, which typically report the condition of different elements (e.g. main beams, abutments, drainage etc.) according to a predefined scale set out in the CSS inspection. The BCI values can be interpreted broadly as the "percentage service potential" of a bridge. Thus a BCI value of 100 implies that the bridge has retained 100% of its service potential; a value of 60 implies that the bridge has lost 40% of its service potential and a value of 0 implies that the bridge is no longer serviceable.

Table 6-11 Highway Inventory for South Yorkshire

Inventory item	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC
Bridges	153	294 (DMBC) 452 (All)	52	173
Culverts	66	108	105	123
Subways	10	8	32	50
Footbridges	13	6 (Road) 1 (Canal) 1 (Rail)	11 (Road) 138 (PROW)	202
Viaducts	unknown	0	2	1
Gantries / ramps	unknown	2	0	22
Retaining Walls	3055 (on Classified network).	558	2000 (approx.)	Limited data… survey ongoing
High Mast Lighting	2	unknown	32	98

Source: South Yorkshire Overarching Highway Asset Management Plan, Version 9 (April 2010)

Public Transport Inventory

6.26. Within South Yorkshire there are a total of:

- 5 supported bus and rail interchanges;
- 2 bus stations;
- 7 supported mini-interchanges;
- 7,815 bus stops; and
- 49 tram stops.

6.27. The public transport assets within South Yorkshire include those identified in Table 6-12.

Table 6-12 Profile of Bus Stops in South Yorkshire

Inventory item	Barnsley MBC	Doncaster MBC	Rotherham MBC	Sheffield CC	Total
Bus Stops with Shelters	589	709	723	1328	3349
Bus Stops without Shelters	792	1066	850	1767	4475
Bus Stops at Parish Council Shelters	16	10	6	17	49
Total	1405	1789	1580	3110	7884

Source: SYPTE 2010

6.28. These assets are maintained by South Yorkshire PTE, supporting the ambition to increase public transport mode share and accessibility by focusing on the continued development of high quality products and services. SYPTE has defined a routine and planned maintenance programme for all its assets, and partnership working with contractors and the local highway authorities is essential for the effective delivery of this maintenance programme.

Improving Assets Management

6.29. It can be seen from the preceding sections that the nature and extent of the highway network in South Yorkshire is complex and wide-ranging. Within each authority's HAMP, there are many legislative, service delivery and operational impacts on the way the various highway services are provided and implemented.

6.30. Underpinning the overarching HAMP and fundamental to the whole process of highways asset management is an appreciation of what the network comprises (inventory) and the present condition of the assets. The preceding sections demonstrate that gaps exist in the highway asset inventory for South Yorkshire, and that the current performance indicators are inadequate to understand the real condition of the wide range of assets needing to be maintained. Each individual authority is at varying stages of collection of the inventory information, although completion of this exercise is a high priority.

6.31. As well as filling in the gaps in the highway asset inventory and establishing new condition performance indicators, more work needs to be done in gaining public and stakeholder opinion on service delivery so that highway maintenance priorities and service levels can be defined and published. Each authority within South Yorkshire is developing an Improvement Action Plan, through which continuous improvement of highway service delivery will be achieved. These plans will be specific to the individual life cycle and will have a five-year lifecycle, with individual improvement actions prioritised within this timeframe.

6.32. In particular it is considered that a continued improvement in service delivery will be achieved through further joint-working, effectively and better communicating the nature, extent, coverage and timings of the various services being delivered between neighbouring authorities and with utility organisations to promote the continuity and consistency of cross-boundary services, maintenance operations and facilities. This would provide a more coordinated and aligned approach to service delivery for the road user and would support the network management duty that has been placed on Local Authorities by the Traffic Management Act 2004. Wherever possible the opportunity will be taken to coordinate maintenance works in a holistic fashion when major transport improvements are being implemented, as is already occurring on the South Yorkshire Quality Bus Corridors. Here the ancillary maintenance requirements of the corridor are considered together with those of the adjoining streets and connecting footpaths, as well as bridge strengthening and maintenance.

6.33. Joint South Yorkshire-wide contracts have been let for condition surveys of the road network and other activities for collaboration are being pursued for further improving service delivery, efficient network operation and cost savings. One example of this collaborative working which is already in progress is the collaborative surface dressing contract which is currently in operation.

7. Summary

7.1. This Evidence Base document, the second in the series of eight documents, provides an overview of the transport networks in SCR. There are many topics where overlaps exist between this document and others in the series. Specifically, further information is provided in the following documents:

- Document 1: Geographic and Demographic Overview
- Document 3: Forecasting
- Document 5: Supporting Economic Growth
- Document 7: Enhancing Social Inclusion and Health

7.2. The key messages from this Evidence Base document are summarised below:

- Our network gives us potentially excellent connectivity, as we have a large number of through routes, for example the M1 and M18, A1(M), M180, A616, A628, East Coast Main Line, and Cross Country, East Midlands and Transpennine rail services. There are pressures at peak periods when through traffic and local commuting combine.
- To help manage our network effectively and efficiently, we have divided the transport network within the SCR into simple 'national', 'strategic' and 'local' categories.
- The western road links, particularly to Manchester, are of low capacity and poor resilience. Travel times tend to be unreliable and there are disruptions during bad weather.
- Over 90% of workers in SCR commute within the SCR boundaries. Of the workers who live in SCR, 70% work within their own authority's (District) boundaries and 19% travel to other SCR Districts for work, especially from Bolsover and North East Derbyshire.
- The spatial distribution of travel patterns reflects the economic linkages within and outside the SCR. Most travel is within District boundaries, and of particular note are the short trips. Some 10% of journeys to work already are walking trips, and up to 3% per District are cycling trips.
- It is also important to recognise that over 50% of trips are not for work, study or business trips, i.e. they are trips for shopping, visiting friends, sports and entertainment. Leisure is also the fastest-growing trip purpose, hence our strategy must address the needs of 'leisure' travellers.
- Within the SCR, the strongest relationship in travel between Districts is between Rotherham and Sheffield (over 33,000 movements each day).
- The rail service pattern reflects the compromise between serving through bulk freight trains, express trains and local stopping services on the same lines. This results in slow rail speeds and is felt throughout the SCR, but perhaps most significantly through the rail capacity issues on the Hope Valley line to Manchester, and the onward Sheffield–Rotherham-Leeds line.
- Freight movements need to be catered for by the transport network. At present road freight is the most used mode. Rail and inland water-based modes have the potential to reduce the burden on the road network.

- The strategic network in Sheffield, Rotherham, Chesterfield and Barnsley is vulnerable to congestion and diversion from the M1. Similar issues occur in Doncaster, if the A1(M) and the M18 is either congested or closed due to works or incidents.
- During peak periods there are extensive delays on most radial routes, such as stretches of the A61. Places where through traffic joins local commuting flows experience delays.
- The total distance travelled by cars in the SCR increased by 4.1% between 2003 and 2008, compared to a national increase in same period of 3.8%.
- Overcrowding is a particular problem on the tram network at peak periods. The bus network suffers less from overcrowding; the challenge is helping buses run reliably and punctually.
- Maintenance is currently prioritised in line with available funding, taking into account the increasing traffic volumes, wear and tear, and the importance of strategic routes. This ultimately leaves limited funding available for the local networks, resulting in a worsening condition of this network.
- The need to ensure the network is well-maintained also includes cycleways, footpaths and shared spaces. As part of the prioritisation of maintenance activities it is important to give sufficient attention to the provision of high quality surfaces for walking and cycling.