Shropshire Local Transport Plan 3

Evidence Base

Part 4: Traffic, Carbon Reduction and Environment

December 2010

1. Traffic growth

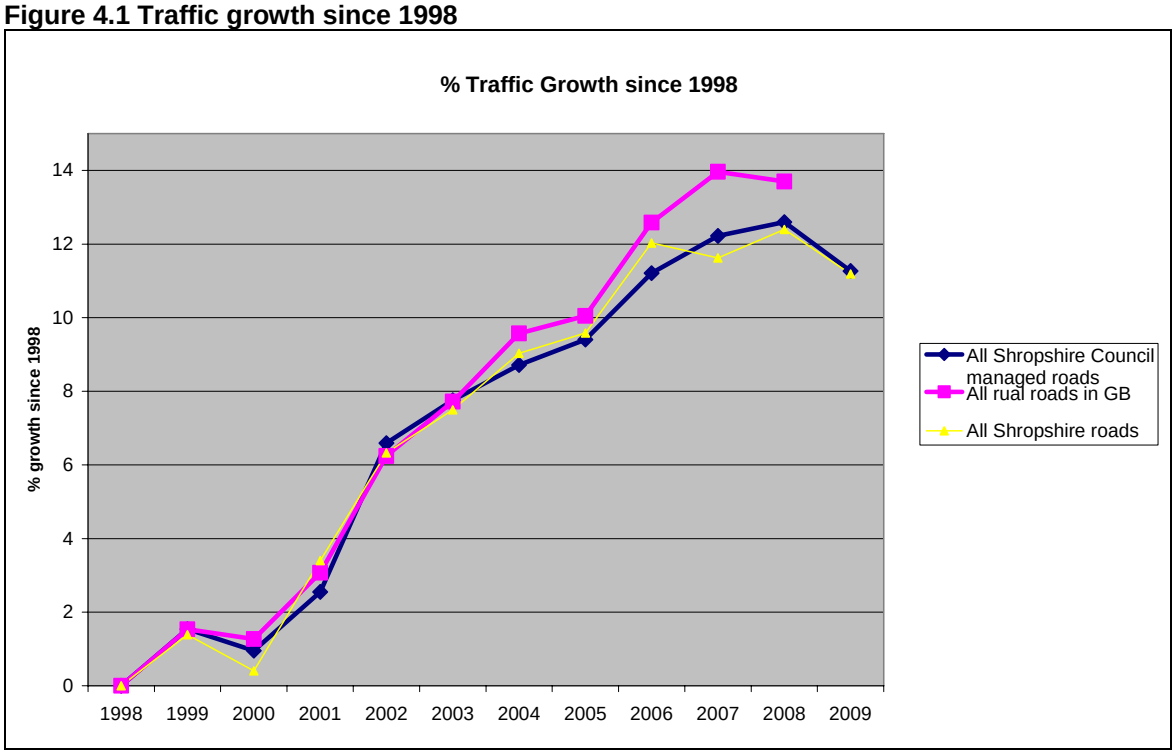
Recent traffic growth in Shropshire

In 2009 a total of 3,041 million vehicle km were driven on roads in Shropshire. In the ten years from 1998 to 2008 traffic on roads in Shropshire grew by 11.2 % this was slightly lower than growth on all rural roads[1] in Great Britain which increased by 13.7% over the same period.

There was a slight reduction in traffic levels in 2009 which is expected to be in connection to the economic recession.

Nationally, traffic levels have grown at an average of 1.6% per annum since the mid 1990's. Whilst significant, it is actually the lowest rate of growth since the 1950s when mass car ownership first started.

Figure 4.1 Traffic growth since 1998



The rate of growth in the second half of the 2000's has been significantly slower than the first part of the decade. In our second LTP we set a target to constrain traffic growth on Shropshire managed roads to less than 1.5% per annum (or 9% from 2004-2010). The total growth on Shropshire roads 2004-2009 was 2.3%; hence we are well on track to achieve this target

[1] Rural roads are those classed as being outside of a urban area of more than 10,000 population

Growth by different transport sectors

Fig 4.2 shows that on major roads in Shropshire the mode showing the most significant growth is light goods vehicles, such as vans. LGV traffic grew by 20% between 1998 and 2009. This is in line with national trends and will in part reflect the increase in internet shopping and related delivery services. Growth in the use of LGVs has had a significant contribution to the overall traffic growth in recent years, as it can be seen that the number of car journeys has actually remained relatively constant since 2002.

The volume of HGV's has been relatively steady, except for a significant drop in 2009 presumably related to the recession. The number of bus journeys in Shropshire dropped significantly after 2003 when there was a major service review resulting from the end of national rural bus grants.

Figure 4.2 % change on 1998 vehicle AADF on major Shropshire roads

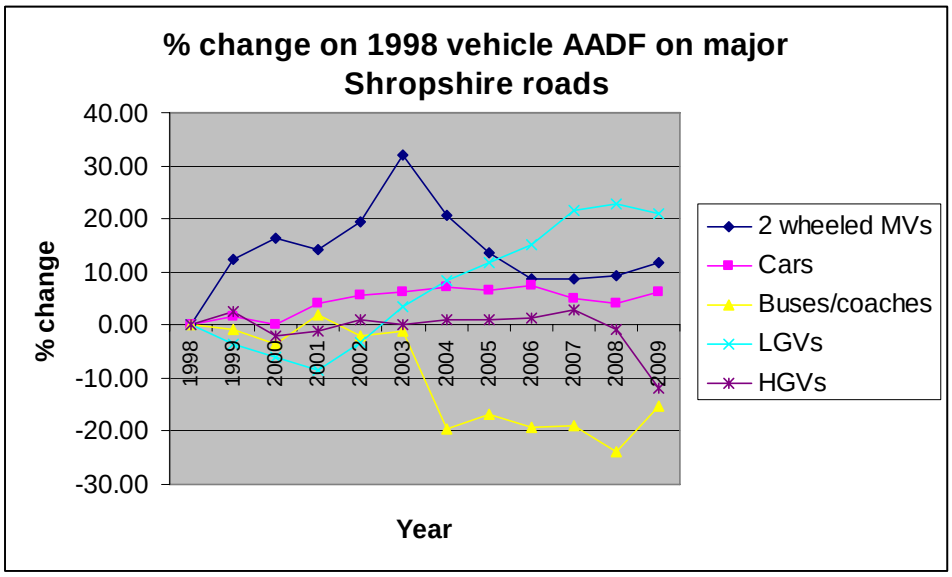


Fig. 4.3 shows that car traffic on minor roads in Shropshire had reduced by 10% since 2003, but there has been a significant rise in LGV traffic. The significant reduction in buses using rural roads reflects the replacement of rural bus services with ShropshireLink in 2008/09.

Figure 4.3 % change on 2003 vehicle AADF on minor Shropshire roads

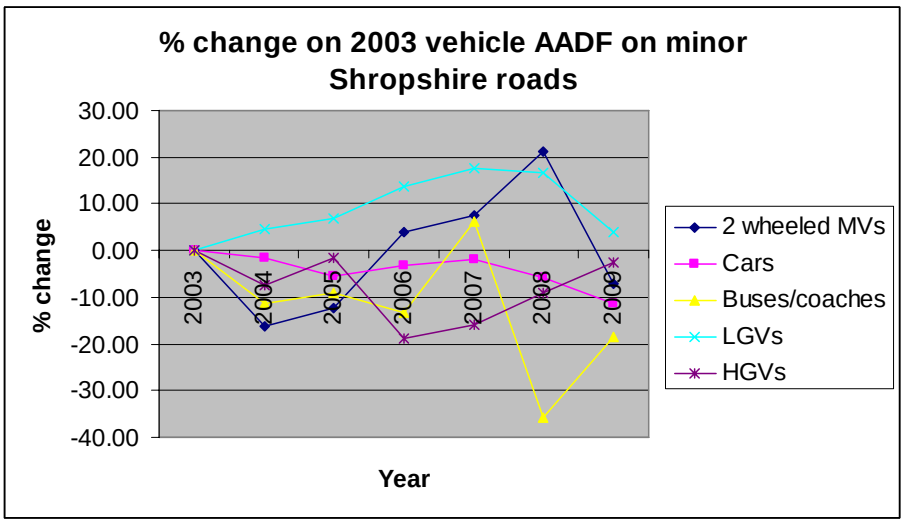
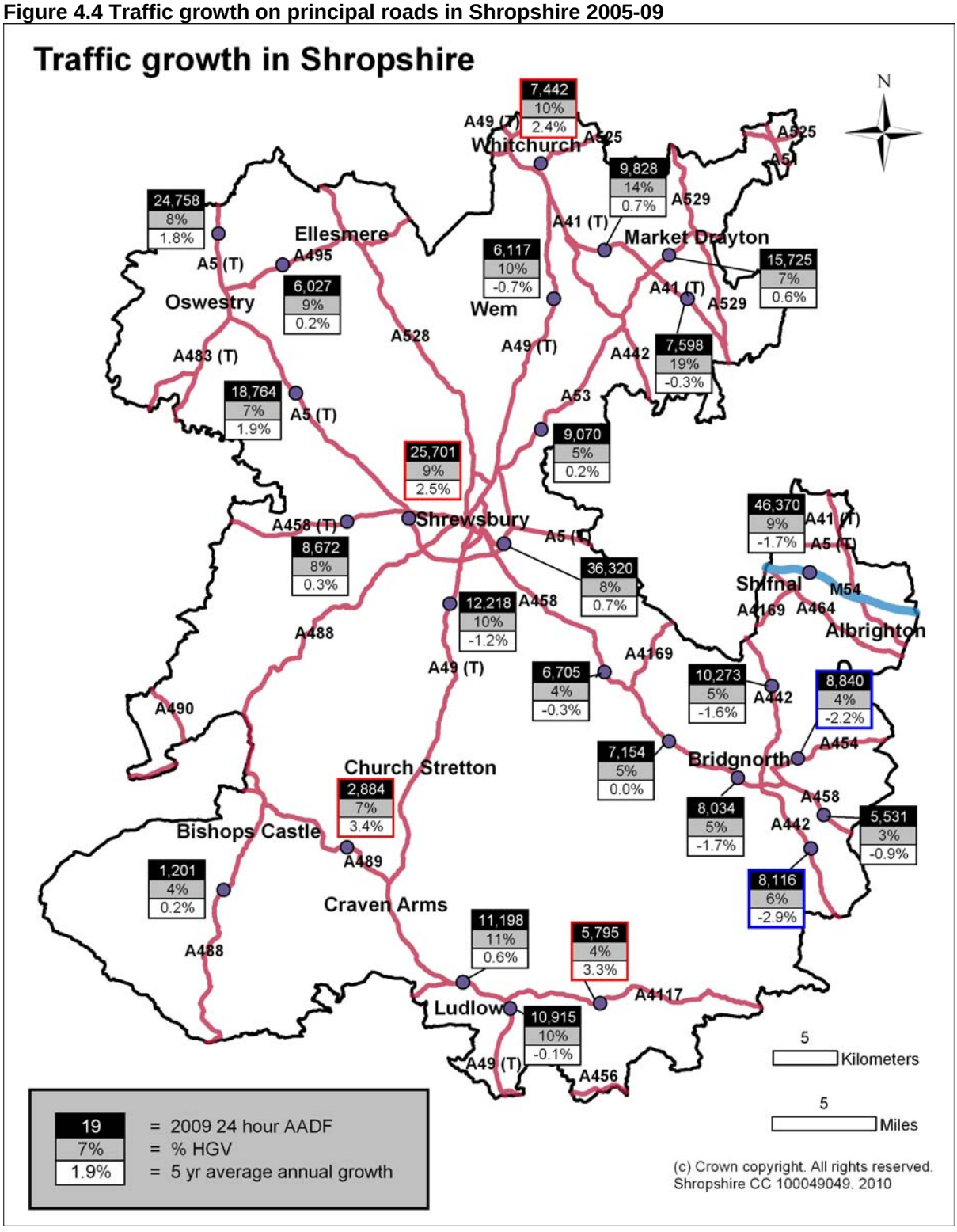


Fig 4.4 below shows the change in traffic levels on trunk and principal roads in Shropshire over the last 5 years (2005-2009) and the portion of HGV traffic on these routes.

Figure 4.4 Traffic growth on principal roads in Shropshire 2005-09

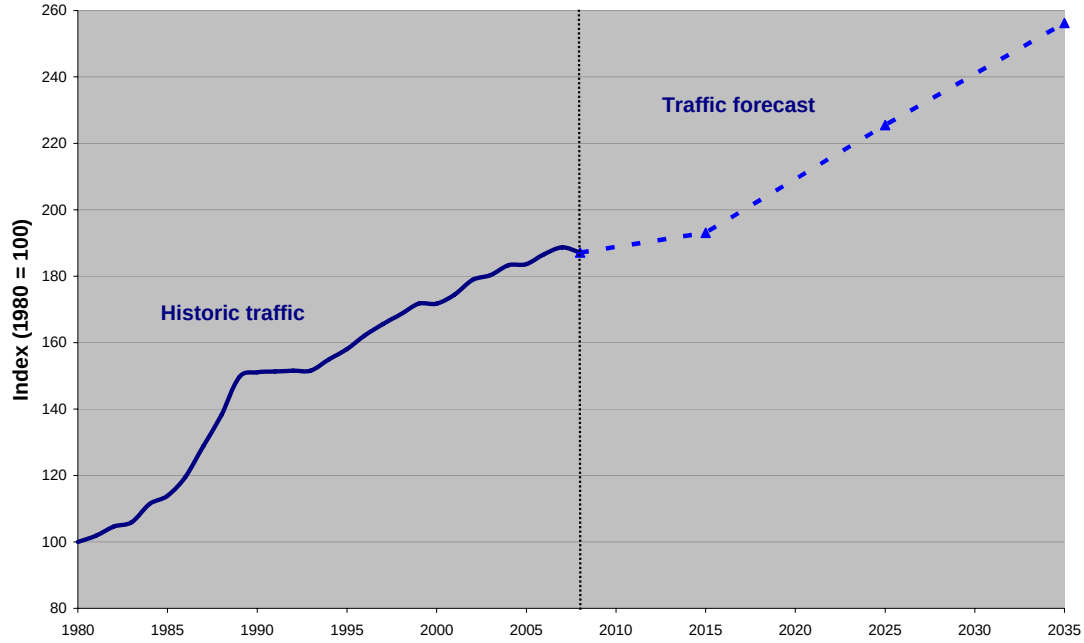


Future traffic growth projections[2]

Traffic in rural areas of the West Midlands is predicted to grow by a total of 15% from 2003 to 2015, much of this growth has already happened. Growth beyond 2015 is expected to be more rapid resulting in total growth of 22% between 2003 and 2025. This is a slightly lower than the projected English average rate of growth (7% by 2015 and 27% by 2025), as traffic growth in the south and east of England is expected to be higher. Overall the national average rate of traffic growth is expected to be around 1.1% per annum to 2035

Growth is projected to be slightly above this rate for motorways, and slightly less for principal roads.

Figure 4.5 Trends in total traffic, 1980 – 2035, Great Britain



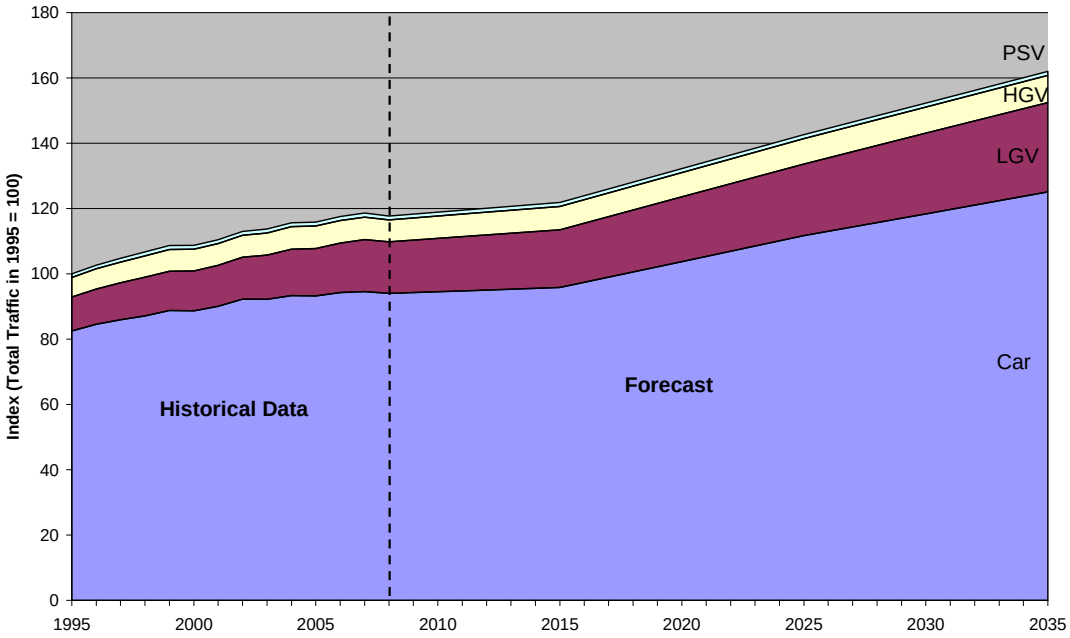
Source: Historic data from DfT (2009); forecasts from NTM

Car traffic growth is predicted to be very slow until 2015 (just 2% growth from 2003), then slightly more rapid, meaning that by 2025 there will be a 17% increase in car traffic. Over the same period LGV traffic will increase by 63%.

The proportion of HGV traffic is not expected to increase. One of the determinants of HGV traffic forecasts is the trend in the average length of haul, which has flattened off considerably in recent years. HGV traffic is concentrated on strategic roads. LGV traffic is projected to continue to grow rapidly.

[2] Road Transport Forecasts 2009 Results from the Department for Transport's National Transport Model, DfT

Figure 4.6 Forecast traffic growth by mode



Source: Historic traffic data from DfT (2009); forecasts from the NTM 2009.

Local traffic growth predictions

Data from the new DfT TEMPRO forecasting program provides forecasts of traffic growth for different areas of Shropshire. These are predictions of total travel growth by all modes. Oswestry town and rural areas of Shropshire, particularly in the north, are predicted to have the most rapid rates of travel growth.

Table 4.1 TEMPRO forecast traffic growth for areas of Shropshire

Location	2011-2016 (5 Years)			2011-2021 (10 years)			2011-2026 (15 Years)		
	AM	PM	Weekday	AM	PM	Weekday	AM	PM	Weekday
Shrewsbury	1.08	2.69	2.34	2.93	5.72	5.13	4.33	8.36	7.68
Oswestry	3.42	4.91	4.72	6.84	9.89	9.32	9.52	14.42	13.57
Bridgnorth	1.13	3.92	3.28	2.94	7.77	6.64	4.27	10.83	9.50
North Shropshire Towns	2.52	4.16	3.77	5.11	8.14	7.42	6.93	11.31	10.45
South Shropshire Towns	0.87	2.85	2.50	2.33	5.60	5.01	3.34	7.66	7.10
North Shropshire Rural	4.63	5.95	5.70	9.61	12.12	11.59	13.50	17.36	16.70
South Shropshire Rural	2.46	3.63	3.52	5.67	7.36	7.23	8.21	10.35	10.44
Central Rural	2.75	3.95	3.78	6.52	8.47	8.21	9.69	12.56	12.35

Implications of traffic growth

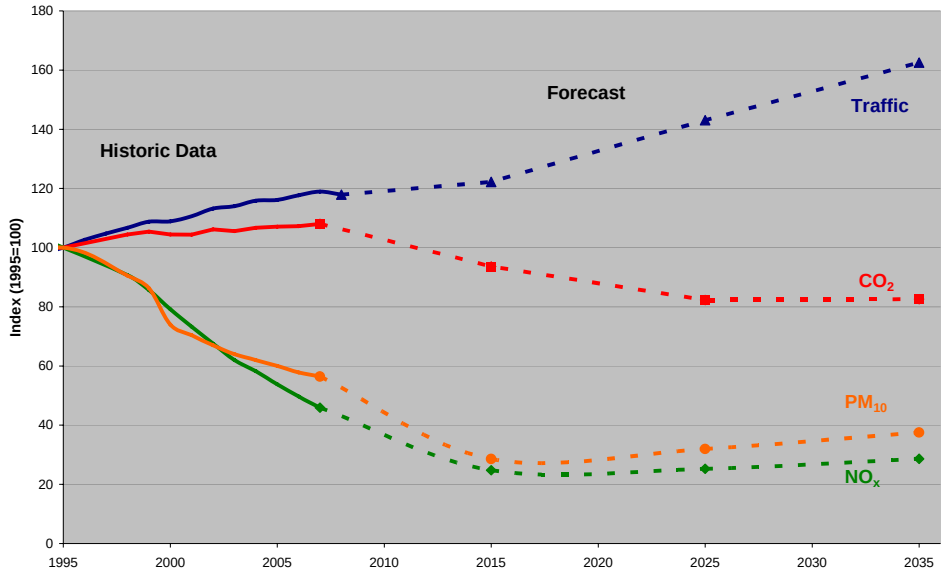
Traffic growth not only affects journey times and congestion, it is also a major factor in determining road traffic emissions. Table 4.2 and fig 4.7 show the key forecasts for traffic and emissions. The National Traffic Model forecasts show that traffic, journey times and congestion are expected to continue to increase; whilst CO_2 will begin to decline and air pollutants will continue their decline, due to cleaner, more efficient vehicle technologies.

Table 4.2: Summary of key forecasts

England, forecast change compared to 2003	Year	Traffic (vehicle km)	Congestion (lost time/km)	Journey time (time/km)	Road traffic total emissions		
					CO_2	PM_{10}	NO_x
Central forecast	2015	7%	6%	1%	-11%	-55%	-60%
	2025	25%	27%	4%	-22%	-50%	-59%
	2035	43%	54%	9%	-22%	-41%	-54%

Source: NTM 2009

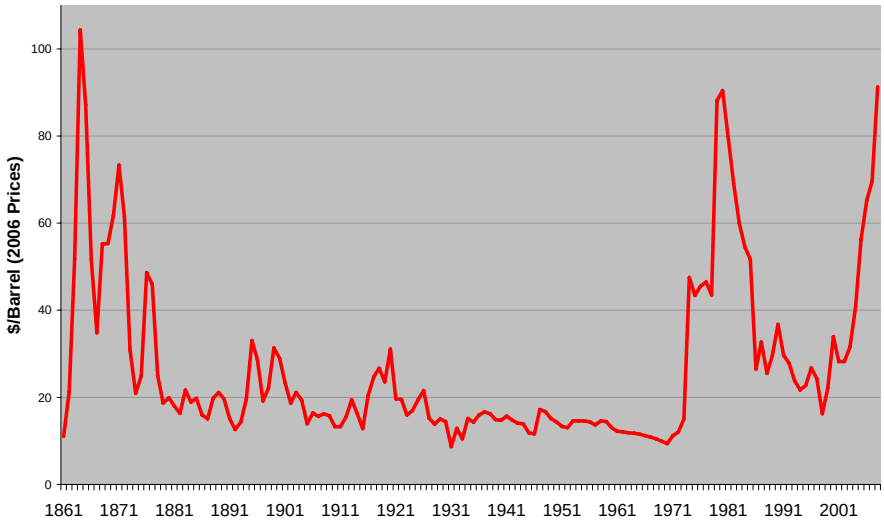
Figure 4.7: Historic and forecast traffic and emissions, England



Source: Historic data from DfT (2009); Historic emissions from Defra (2009); forecasts produced by the NTM.

Fuel prices and peak oil

Figure 4.8 Oil prices 1861 to 2008 (annual average)



Data source to 1999: Energy Information Administration, US. Post 1999: Brent crude, DECC

Oil prices have been particularly high in recent years, comparable with the oil crisis in the 1970's.

Peak oil is a phrase often used to describe the situation when global oil supply reaches a peak. Following this peak, oil supplies decrease and never rise again. There are varies estimations of when peak oil has or will occur, some consider it has already happened while others predict 2020 or later. However, worldwide demand for oil continues to increase at an extraordinary rate, and oil prices are predicted to continue to increase, particularly in the early part of the plan period.

While the cost of driving per kilometre is a key determinate of traffic and congestion levels, the cost of driving includes various other elements (not just fuel costs) including the costs of purchasing a vehicle, insurance and servicing costs. (In recent years falling car purchase costs have actually meant cost of driving has fallen, even while fuel prices have increased.)

Between 2003 and 2015 the fleet average cost of driving per kilometre is expected to increase by 15%, as increasing fuel costs outweigh improvements to fuel economy during this period. After 2015 it is expected that fuel economy will increase much more rapidly through to the car fleet, and the costs per kilometre of driving will fall. Table X shows these assumptions over time.

Table 4.3: Percentage changes to the average cost of driving per kilometre, from 2003

2003-2015	15%
2003-2025	-11%
2003-2035	-23%

Source: DfT 2009

Increased fuel prices, particularly in the first part of the plan period are expected to mitigate the otherwise expected growth in traffic, congestion and emissions. However, increased vehicle fuel efficiency which will come into effect in later years means that CO_2 emissions are expected to fall, but also that car use will be cheaper, hence encouraging more rapid traffic growth and congestion.

2. Carbon reduction

Impacts of climate change

Climate change is recognised as possibly the greatest threat facing the world today. Impacts that have been predicted for Shropshire include:

- An increase in average maximum temperature of up to 4°C by the 2080s. Most warming will occur during the summer, although very cold winters will become less frequent.
- Summer rainfall to decrease by up to 30% by 2050, and 50% by the 2080s.
- Winter rainfall to increase by up to 20% by the 2080s.
- More short duration extreme weather events such as storms and floods

These changes are expected to result in building and infrastructure damage from extreme weather events, loss of biodiversity and landscape character, and impact on agricultural practices leading to increased water demand and increased health risks from higher summer temperatures.

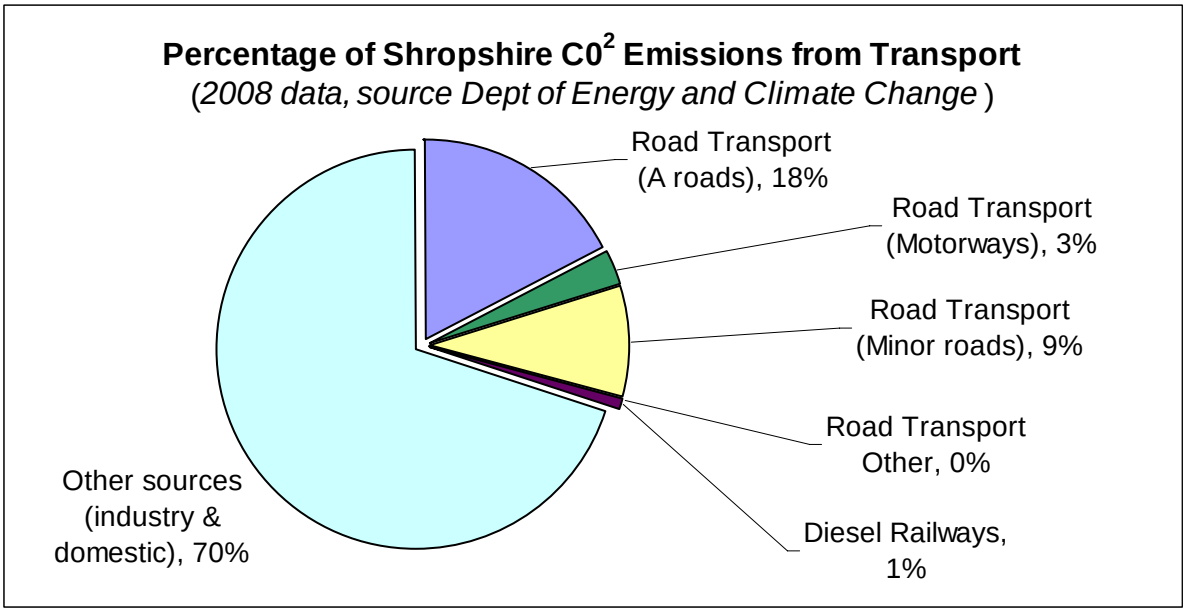
National targets for reducing carbon emissions

The Climate Change Act 2008 has created a legal requirement for at least a 34% reduction in UK greenhouse gas emissions by 2020, and at least an 80% reduction by 2050 from a 1990 baseline.

Transport's contribution to carbon emissions

Transport in Shropshire is the source of 754,910 tonnes of CO_2 annually, about 30% of Shropshire's total carbon emissions[3]. This is slightly higher than the UK average; transport contributes 24% of all UK domestic CO_2 emissions (DfT). Fig 4.9 shows the breakdown of these emissions, with nearly all coming from road traffic.

Figure 4.9 Percentage of Shropshire's CO2 emissions from transport



[3] Source: Dept of Energy and Climate Change

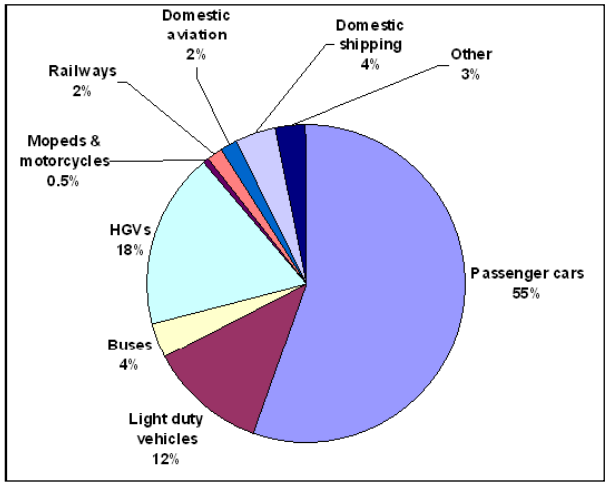
Breakdown of transport emissions

We do not have a modal breakdown of carbon emissions for Shropshire but fig 4.10 shows the 2008 UK breakdown.

Nationally cars currently represent 55% of domestic transport greenhouse gas emissions, with vans accounting for a further 12%, a number which is growing as this sector expands. Buses accounted for 4% and HGVs 18% of total domestic transport greenhouse gas emissions.

We would anticipate that in Shropshire the proportion of emissions for cars would be slightly higher than the national average, and the proportion from HGV's and buses lower.

Figure 4.10 % of carbon emissions by mode of transport 2008



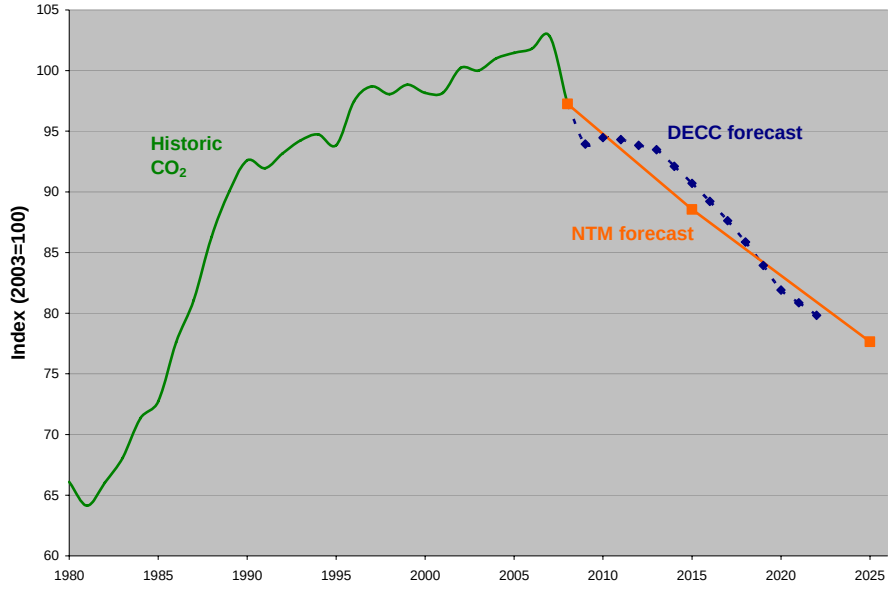
Projections of carbon growth

There are two basic factors which influence the level of carbon emissions from transport:

- **Efficiency of vehicles** - the amount of carbon produced per mile travelled, this is influenced by fuel type, engine efficiency, vehicle weight and size, driving style, speed, type of journeys etc.
- **Traffic levels -** the number of miles travelled by motorised vehicles, this is influenced by the length of journeys, number of journeys, mode choice etc.

Despite the projections for significant (27%) increases in traffic growth over the next 15 years, the Government projections indicate a significant reduction in traffic related CO^2 emissions. Levels of CO^2 emissions are predicted to drop to around mid 1980 levels by 2025, about a 22% reduction.

Figure 4.11: DfT & DECC CO_2 forecasts, UK



Source: Historical data from DEFRA, DECC forecast from DECC (2009), DfT forecasts from the NTM 2009

The projected decrease in carbon emissions is primarily due to the expected increased vehicle efficiency as a result of EU new car CO_2 regulations. The DfT are expecting a 47% increase in fuel efficiency of the average car between 2003 and 2035.

Vehicle efficiency

Vehicle carbon efficiency is affected by fuel type, car weight and design, and driver behaviour.

EU regulations mean that new cars will become significantly more efficient over the plan period The EU new car CO_2 regulation includes a mid-term target of 130 grams of CO_2 per kilometre by 2015 and a long-term target of 95 grams of CO_2 per kilometre by 2020.

Alternatively fuelled vehicles will become increasingly important over the plan period.

Currently available vehicles that have lower carbon use per mile driven include:

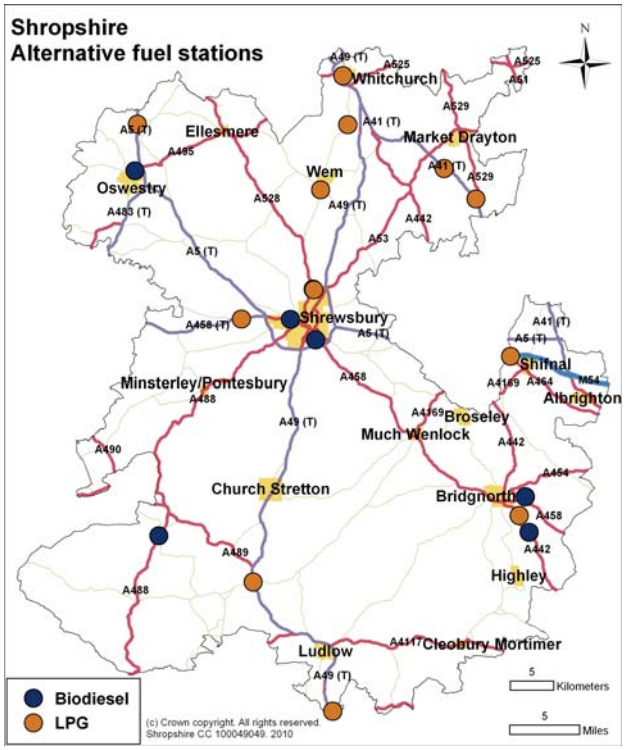
- more efficient petrol and diesel vehicle
- hybrid petrol-electric or diesel-electric vehicles
- first generation biofuels (bioethanol made from sugar or starch crops and biodiesel made from oil crops and wastes)

Technology options which may become very significant over longer timescales are[4]

- "plug-in" hybrids which can be re-charged from the electricity grid
- fully electric vehicles
- second generation biofuels, manufactured from a wide range of biomass sources hydrogen powered vehicles and fuel cells

The current alternative fuel stations in Shropshire are shown in fig 4.12.

Figure 4.12 Alternative fuels stations in Shropshire



Travel speed

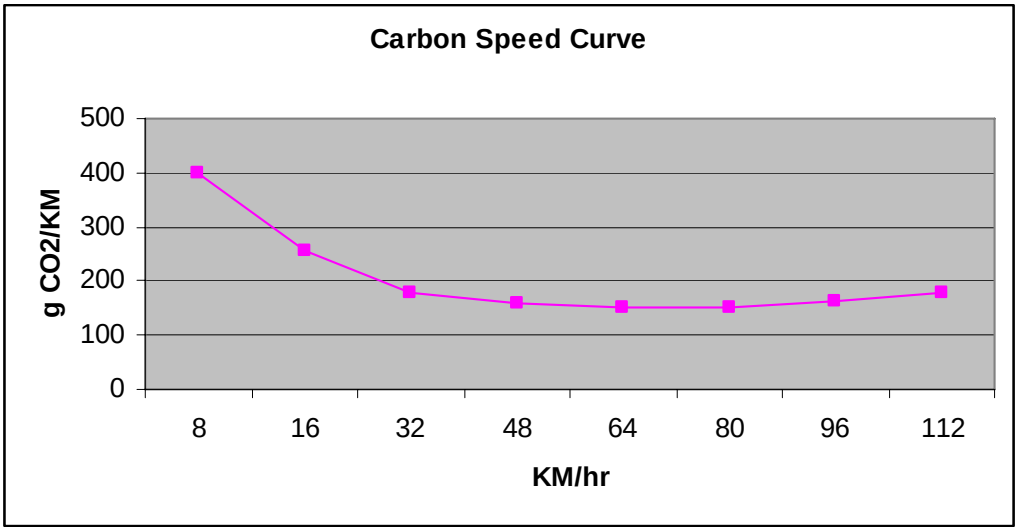
The speed at which vehicles travel affects the levels of carbon emissions. Carbon emissions are therefore influenced by congestion and speed limits. Table 4.4 is based on DfT data and shows the average g CO_2 per km travelled for cars, based on the current national vehicle fleet. This shows that the optimum speed in terms of carbon emissions per km travelled is around 40 mph.

[4] (*A Review of the UK Innovation System for Low Carbon Road Transport Technologies,* E4tech, www.dft.gov.uk/pgr/scienceresearch/technology/)

Table 4.4 Average g CO_2 per km travelled for cars

Miles per hour	km per hour	g CO_2/km
5	8	398.4
10	16	254.3
20	32	180.2
30	48	157.2
40	64	150.3
50	80	152.5
60	96	161.7
70	112	177.0

Figure 4.13 Average g CO_2 per km travelled for cars



Travel mode and distance travelled

Table 4.5 presents forecast growth of total distance travelled by different modes from 2003 to 2015, 2025 and 2035. Total passenger kilometres are forecast to increase by 27% between 2003 and 2035.

Table 4.5 Change in total distance travelled by mode

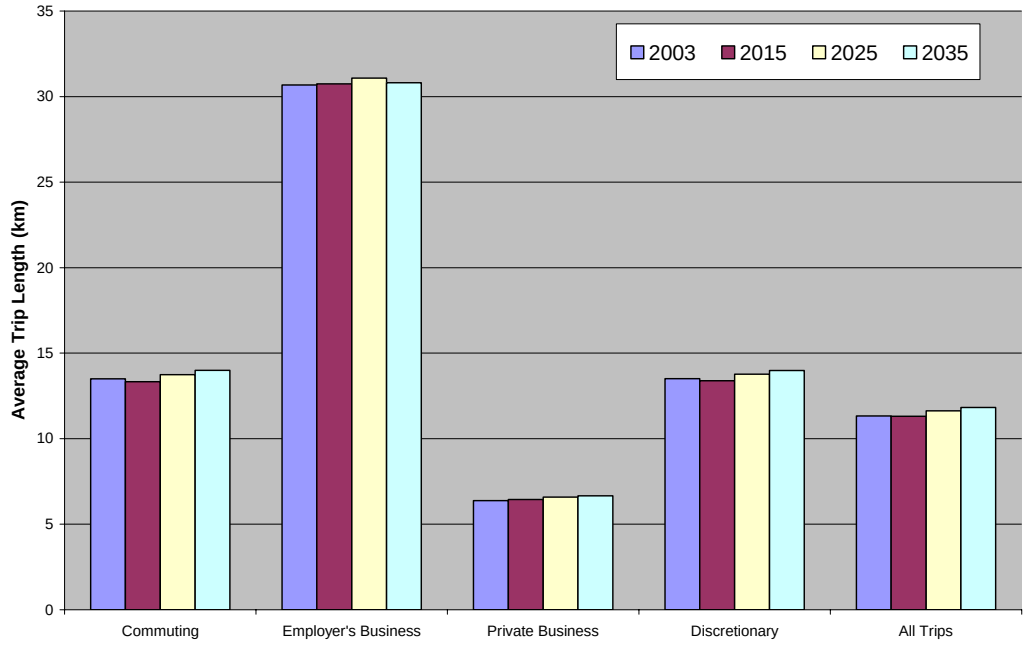
England, passenger kms		% change to 2015	% change to 2025	% change to 2035
Car total		6%	16%	26%
	Driver	4%	21%	35%
	Passenger	9%	8%	10%
Bus		29%	31%	36%
Walk/cycle		11%	16%	24%
Total		8%	17%	27%

Source: Forecasts from the NTM

In 2003, car travel accounted for 81% of total movements and it is forecast to reduce its share very slightly to 77% by 2035. This is mainly due to the population growth being concentrated in urban areas where congestion and shorter journeys make alternative modes to the car more attractive.

Figure 4.14 shows projections of the change in average trip length over time, as well as variation in trip lengths by journey purpose. Between 2003 and 2035, the average trip length is forecast to increase by around 4% from about 11 kilometres to just under 12 kilometres.

Figure 4.14 Average trip length, England



Looking at the NTS data for the distance travelled for different journey purposes and the journey purpose of car driver journeys it can be seen that the highest proportion of car mileage is as a result of leisure journeys (including holidays and visiting family and friends), followed by commuting mileage; with shopping and business mileage also being significant.

Figure 4.15 % of total distance travelled by journey purpose

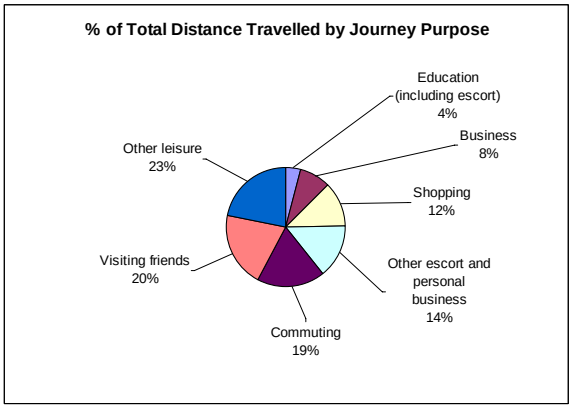
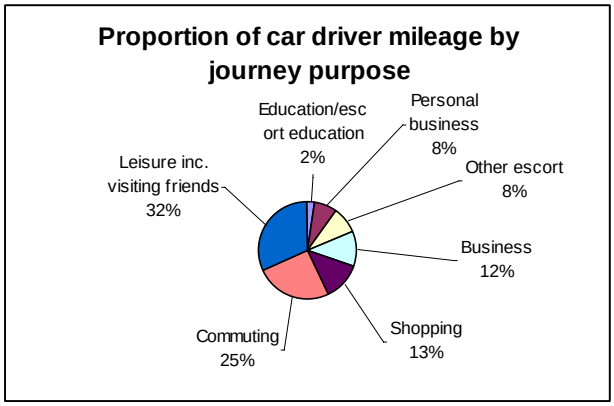


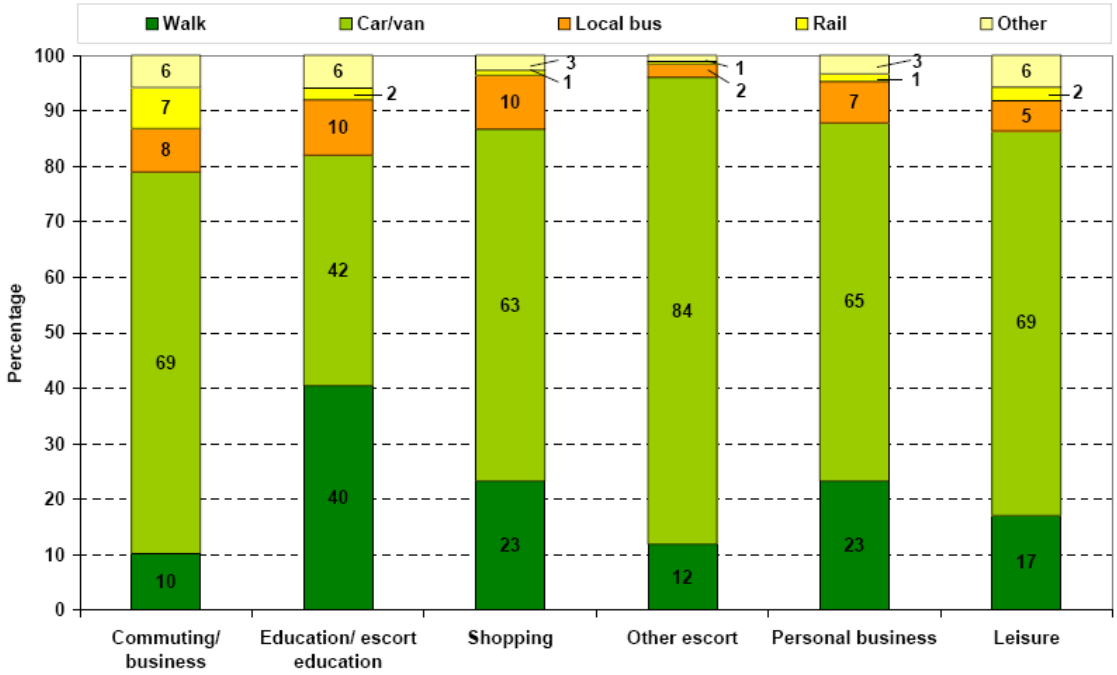
Figure 4.16 Proportion of car driver mileage by journey purpose



The following chart gives an idea of the propensity at a national level to use alternative modes for particular journey purposes. There is significant car dependency for leisure journeys, with limited use of all other modes, there is also high car use for commuting and business trips; however use of bus and rail is relatively high. There is greater use of walking and bus for shopping trips.

Figure 4.17 Trips by main mode and purpose: Great Britain, 2009

(NTS web table NTS0409)



National Travel Survey statistics show that for long distance journeys over 50 miles, 81% are made by car, 12% by rail and 4% by bus/coach and 1% by air. Visiting friends at their home was the most common trip purpose for trips over 50 miles, accounting for 22% of these trips. This was followed by business trips which accounted for 19%.

Shropshire Council Carbon Management Plan

Shropshire Council Carbon Management Plan (2010-2020) aims for a 35% reduction in council related carbon emissions by 2014, and an associated £17.2 million saving in energy costs.

The plan has identified a baseline of 90,608 tonnes of CO_2 emissions during 2008/09. Council owned transport (including business mileage) makes up 13% of emissions, street lights 3% of emissions. The assessment has so far excluded staff commuting and supported public transport services.

Table 4.6 shows how these contribute to the overall transport related carbon emissions for Shropshire.

Table 4.6 Shropshire Council carbon emissions

Source	Annual CO_2 (tonnes) emissions
Shropshire Council transport (owned vehicles and business miles)	11,8895
Street lights	3,1496

[5] 2008/9 estimate
[6] 2008/9 estimate

Identified transport related actions include:

Short term projects (2010-2012)

- Introduce voltage dimming/turn off street lights after midnight
- Install LED lighting with photocells in bollards/ Belisha beacons
- Replace traffic signs with reflective style not requiring illumination.

Medium term projects (2012-2015)

- Introduce a travel plan across the Council
- Install LED street lighting

Long term projects (2015-2020)

- Introduce purchase requirement for lower emission vehicles
- Introduce low/zero emission bus services

3. Shropshire's environment

Townscape and heritage

Shropshire's historic environment is one of the county's greatest assets with features ranging from prehistoric monuments to structures of the industrial revolution; from historic townscapes to fields and gardens, and from castles to mansions. All these combine to create a rich and diverse historic landscape. Well known features include Offa's Dyke, Wroxeter Roman City and the Ironbridge Gorge World Heritage Site, and the historic towns of Ludlow and Shrewsbury. There are also many less well known sites and towns and villages with great significance, and in total over 6,800 listed buildings in the county and numerous town and village conservation areas. Table 4.7 below shows the numbers of designated historic buildings and areas in Shropshire.

Table 4.7 Designated historic buildings and areas in Shropshire

Numbers of designated historic areas and buildings in Shropshire		On EH 2010 Heritage at Risk Register
Type of historic area/building	**No.**	
Listed buildings		
Grade I	117	
Grade II*	485	
Grade II	6283	
Total	**6885**	**35**
EH Register of historic parks and gardens		
Grade I	1	
Grade II*	6	
Grade II	27	
Total	**34**	**3**
EH Register of Battlefields (Battle of Shrewsbury, 1403)	**1**	
Scheduled monuments	**342**	**53**
Conservation areas	**118**	**10**

Shropshire's historic environment is one of the county's greatest assets. Tourists and visitors are attracted to the historic market towns and villages, stimulating local trade and supporting the county's economy. The quality of streets and highway space in all towns and villages, not just those areas classed as historic, is important to quality of life, and makes Shropshire an attractive place for people to live in, work in, or visit.

Between 2001 and 2004 Shropshire County Council undertook a historic landscape characterisation (HLC) project; a report on the technical aspects of this project was published in 2007. The report formed part of English Heritage's national HLC programme. It mapped the historic character of the county's landscape and resulted in the definition of over 30,000 individual survey units and 58 different historic landscape character types.

The aim of the project was to fill the gap in understanding of the wider historic landscape, and the archaeological merit, so that separate and rarely mapped places have on the overall understanding of the landscape. It will be used to help assess the environmental impact of major developments.

Traffic and transport have a significant impact upon the built environment. Transport infrastructure is a key determinant of the form of our towns and villages. Choice of street materials, street furniture, signs, lighting and trees all affect the quality of streetscapes and local amenity. Levels of traffic and parked cars also have a significant impact. Vibration, air pollution and accidental collisions from traffic can damage buildings, whilst visual intrusion and noise can diminish people's enjoyment of historic sites, towns and villages.

There are real opportunities, as part of transport schemes, to improve the historic and built environment, through good design, sensitivity to historic styles, the use of quality materials and the reduction of unnecessary clutter. Recent town centre enhancement work in Shrewsbury and the larger market towns has significantly improved the urban environment, improving the setting for historic buildings as well as enhancing the visitor experience.

The potential significant effects of transport on this historic environment include:

- Damage to historic roadside buildings by traffic vibration, in particular heavy goods vehicles.
- Damage to historic buildings (particularly stone) from the effects of air pollution.
- Damage to historic buildings by accidental collisions.
- Loss of historic bridges due to road widening.
- The ambience of conservation areas can be adversely affected by the presence of traffic and inappropriately placed street furniture.
- Cultural monuments may be severed from their setting due to the intrusion of vehicles including those of people visiting the monument.

Rural landscape

Shropshire's countryside is perhaps its greatest treasure and is highly valued by local people and visitors. Much of Shropshire is still relatively unspoiled and tranquil. The Shropshire Hills Area of Outstanding Natural Beauty (AONB) covers a quarter of Shropshire and significant areas of the rest of the county are designated as areas of special landscape character.

Shropshire County Council has undertaken a countywide landscape character assessment of rural areas, and this informs new planning guidance. This will be used to ensure development is in keeping with local landscape character.

Roads are often the only modern man-made features in large areas of open countryside, and this places an important obligation on those responsible for the transport infrastructure.

The potential impacts of transport on rural landscape quality include noise from vehicles as well as visual intrusion from roads, traffic, parked vehicles, inappropriate street furniture and unnecessary signage. Landscape quality can also be reduced by inappropriate design of road improvements and use of inappropriate materials which can "urbanise" rural roads and lanes, impacting on local character and distinctiveness. Street lighting in rural areas can also lead to light pollution which can reduce the quality of the rural landscape.

Biodiversity

The extent of Shropshire's biodiversity is reflected in the number of statutory designations for nature conservation: 4 national nature reserves and 110 Sites of Special Scientific Interest; 14 of which are RAMSAR sites important for birds, and 698 Ancient Woodlands, as well as 573 non-statutory wildlife sites. Shropshire has six (candidate) Special Areas of Conservation (cSACs) covered by European legislation (Natura 2000). The county also has

two environmentally sensitive areas around Clun and the Shropshire Hills which form part of the AONB. Areas covered are shown in table x.

Table 4.8 Nature conservation designations in Shropshire

Designation	Number of hectares under designation	Percentage of county
National Nature Reserves (NNR)	1,658	0.5
Sites of Special Scientific Interest (SSSI) (includes Ramsar sites and cSACs)	8,715	2.5
Wildlife Sites	c. 10,000	2.9
Area of Outstanding Natural Beauty (AONB)	80,916	23.2

The interaction of biodiversity and the road network is significant with, for example, a quarter of the UK badger population being killed annually and between thirty and seventy million birds.

The potential impacts include:

- Wildlife casualties through collisions with motor vehicles
- Land take and associated habitat loss through new transport infrastructure schemes
- Fragmentation / severance of habitats through new schemes, increased traffic etc
- Changes in air quality, water quality, noise, vibration, light emissions, dust deposition as a result of construction and operation
- Increase in disturbance to wildlife populations
- Creation of barriers to movement
- Hydrological changes affecting surface and groundwater
- Changes to soil
- Inappropriate grass cutting regimes on verges
- Spread of invasive species (e.g. Japanese knotweed spread by verge regime)
- Creation of habitats
- Curbing spread of invasive species

Flood risk

Flood risk is a key issue in Shropshire and in some areas is a significant constraint to new development. In addition to the River Severn and its tributaries, runoff has increased as agriculture has intensified and we have built more roads and houses, which has degraded the natural permeability of the landscape and reduced its capacity to retain water.

Improved drainage of roads will be a key retirements as our climate becomes wetter in winter, with more severe rain episodes.

Air quality

Air quality management

Under an EU directive and 1995 Environment Act local authorities have a statutory duty to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against air quality standards and objectives. Where the results of this ‘Review and Assessment’ process highlight that the relevant Air Quality Standards and Objectives are not likely to be achieved, the authority is required to declare an Air Quality Management Area (AQMA).

Having declared an AQMA the authority is required to make a further assessment in order to identify the level of pollutant reduction required to meet relevant air quality objectives. Additionally, consideration should be made to evaluating local management practices that could be used to improve air quality, and feed into the formulation of an Air Quality Action Plan.

There are currently 5 Air Quality Management Areas in Shropshire:

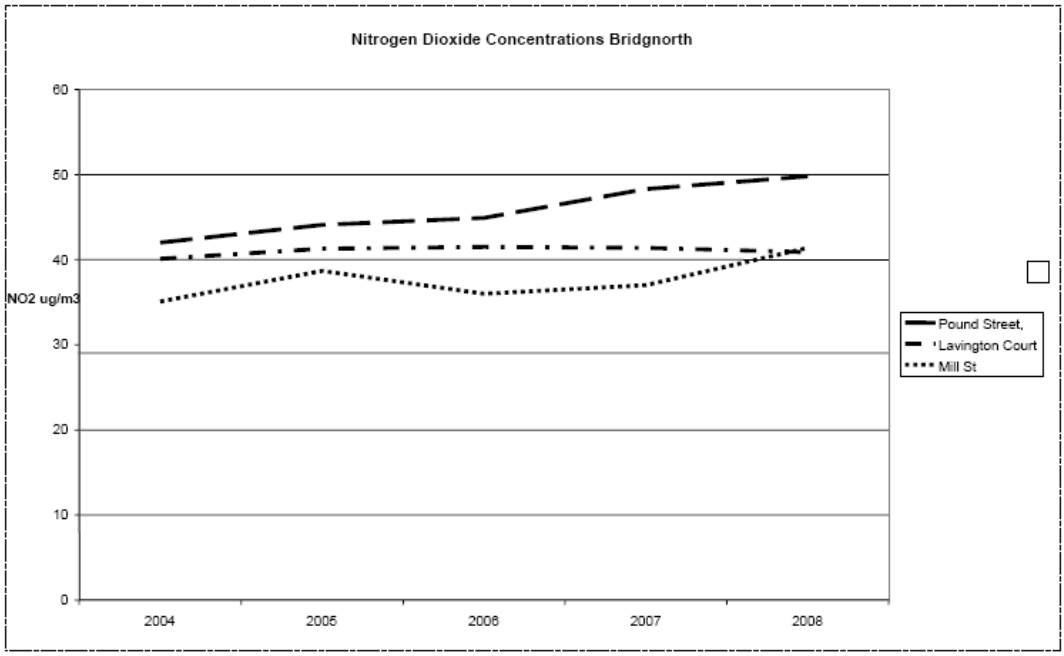
- Shrewsbury town centre
- Around Heathgates Island (Telford Way, Whitchurch Road, Sundorne Road, Ditherington Road junction) on the A5112 in Shrewsbury
- Pound Street, around the junction with Salop Street and Whitburn Street., Bridgnorth
- On the A49 in Bayston Hill (Highways Agency road)
- Small AQMA covering two houses beside the A483 at Pant, near Oswestry (Highways Agency road)

These sites were declared as AQMAs due to expectations that levels of Nitrogen Dioxide ($N0_2$) (from traffic emissions), would exceed the EU objective of 40 µg/m3 NO2 (annual mean). Each of the AQMAs has an action plan identifying both generic and location specific measures to improve air quality in that area.

Monitoring of air quality

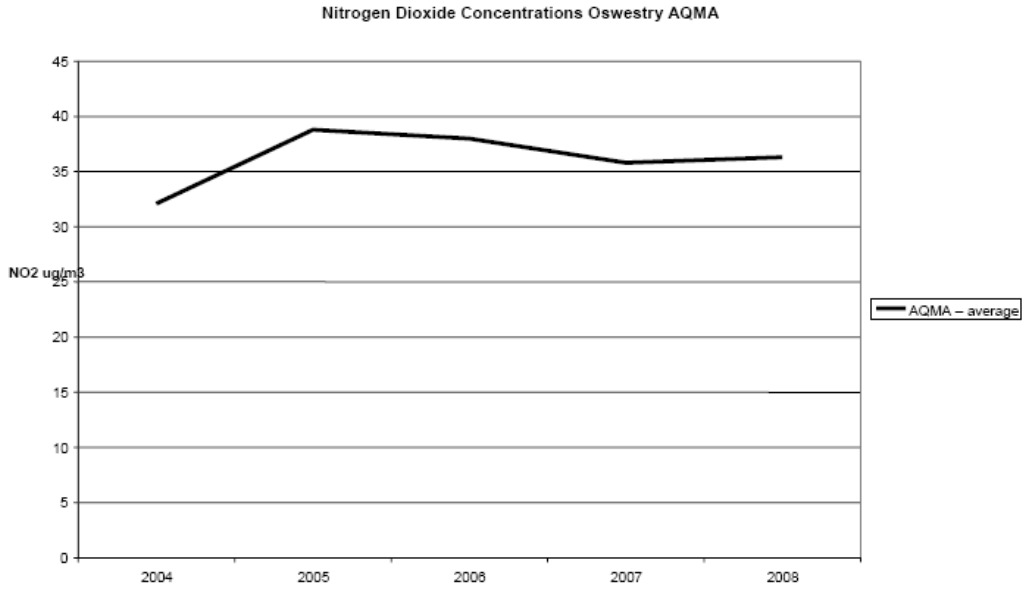
In Bridgnorth levels of NO_2 are currently exceeding the EU objective at Pound Street, within the declared AQMA, and are also close to the objective level at Lavington Court off Underhill Street and at Mill Street in Low Town. Consideration will need to be made to the additional declaration of additional AQMAs to cover these sites

Figure 4.18 NO_2 concentrations, Bridgnorth



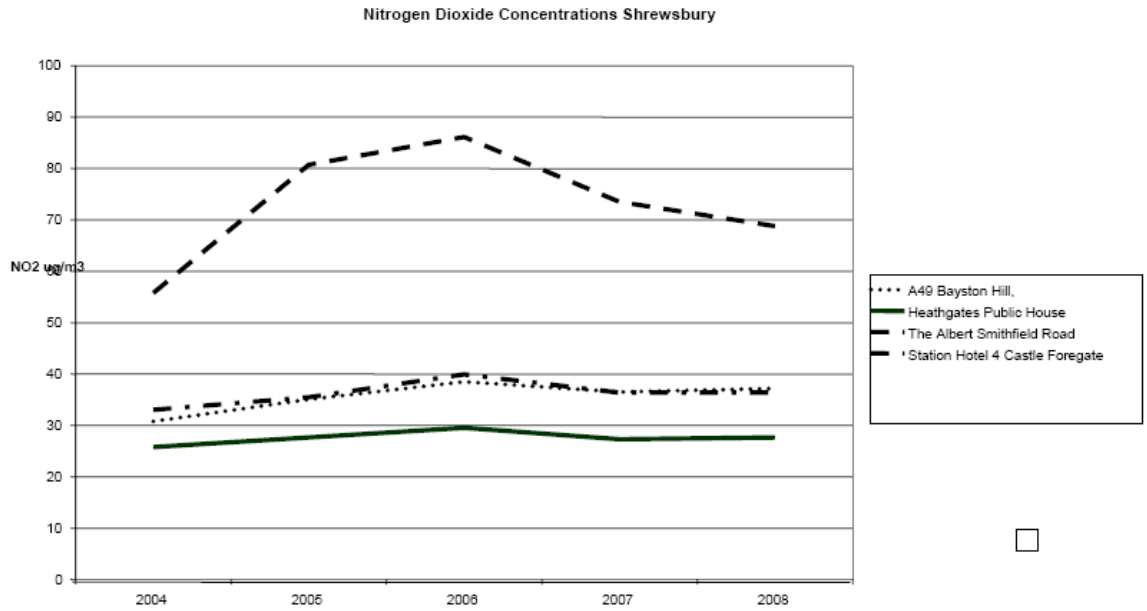
At the AQMA in Pant the annual mean NO_2 levels are not exceeding the EU objective

Figure 4.19 NO_2 concentrations, Oswestry AQMA



In Shrewsbury, NO_2 levels are significantly below the EU objective level at the Heathgates Island AQMA. They are near to the objective level at the Bayston Hill AQMA, and on Smithfield Road, which is within the town centre AQMA. However at Caste Foregate (also in the town centre AQMA) annual average NO_2 levels are significantly above the EU objective, (although levels have fallen slightly since 2006, in line with general traffic reductions observed in Shrewsbury town centre.

Figure 4.20 NO_2 concentrations, Shrewsbury



Ongoing monitoring across Shropshire has also identified other sites of potential concern. These include:

- Mill Street and Underhill Street in Bridgnorth
- Corve Street in Ludlow
- Junction of the A53/A41 at Ternhill
- Cleobury Mortimer

Further monitoring is being undertaken at these sites to determine if any further AQMAs need to be declared

Sources of emissions

Traffic is the main cause of air pollution in Shropshire. Areas of poor air quality tend to be where there are high volumes of stationary traffic, and /or stop-start movements in built up areas where the ability for pollution to disperse is limited.

Different vehicles emit different levels of pollutants depending on vehicle and engine size and efficiency. Older, heavy diesel vehicles tend to be the most polluting. For example one older style diesel bus can emit the same pollution as 40 cars. Detailed analysis of sources of pollution in some of Shropshire's AQMAs has been undertaken and results will be analysed to inform future action plans.

Shropshire Air Quality Action Plan

In light of the continuing upwards trend in nitrogen dioxide concentrations in town centre locations (which is a national trend) and the international and national developments in air quality, it is proposed to develop a single Shropshire Air Quality Strategy. This will be a LTP daughter document and will integrate with the LDF. It will be based on a review of the effectiveness of our existing Air Quality Action Plans and monitoring regimes.

Flooding

Flood risk is a key issue in Shropshire and in some areas is a significant constraint to new development. In addition to the River Severn and its tributaries, runoff has increased as agriculture has intensified and we have built more roads and houses, which has degraded the natural permeability of the landscape and reduced its capacity to retain water

Noise

Noise from transport can have significant environmental impact; effecting human quality of life and heath. The Shropshire People's Panel survey in 2004 found that road traffic was the noise source of greatest annoyance; with 8% stating that it was a serious problem and 18% finding it a minor problem.

The EU Environmental Noise Directive 2002/49/EC (END) set out new legislation to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise. It required a programme for action including:

- determination of noise exposure (noise mapping)
- informing the public about environmental noise and its effects, and
- adopting action plans based on noise mapping results, to prevent and reduce noise where necessary - prioritising the prevention of noise that is harmful to human health, and
- preservation of areas where environmental noise quality is good.

The first round of noise action planning is currently being undertaken, identifying and addressing the most important areas where human health could be affected. Defra has identified the major airports, large urban areas and major road and rail routes that are the most significant sources of noise effecting local populations.

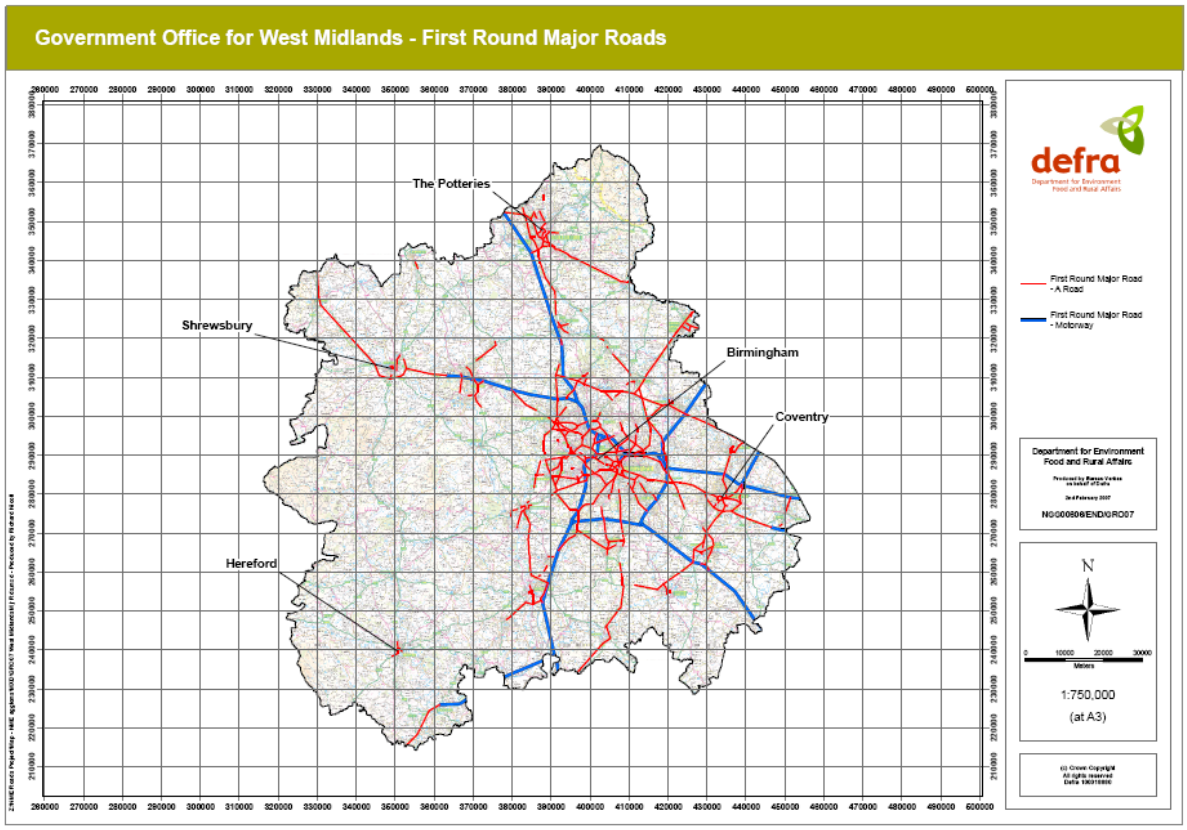
In Shropshire roads identified for assessment in the first round are:

Highways Agency roads: M54, A5 and A483
Shropshire Council roads:

- A41 near Albrighton
- A49 Shrewsbury bypass
- A5112 through Shrewsbury (excluding Hazeldine Way)
- Shrewsbury town centre
- A49/A41 south of Whitchurch

These are shown on the map below:

Figure 4.21 DEFRA first round noise assessments major roads, West Midlands



The generic Noise Action Plan developed by Defra for all major roads outside of agglomerations can be found at:
http://www.defra.gov.uk/environment/quality/noise/environment/documents/actionplan/noiseaction-major-roads.pdf

The Defra Noise Action Plan sets out the process that local authorities and highway authorities must follow to assess the identified first round major roads, and to identify any reasonable interventions that could be implemented to reduce noise or noise impact. Possible interventions might be:

- erecting noise barriers;
- installing low noise road surfaces;
- local traffic management measures, such as re-routing traffic, restricting heavy vehicles or reducing speeds;
- improving the sound insulation of properties

For each important area, the highway authority will need to identify proposed actions or state why, in their view, no further action can or needs to be taken in order to meet this objective. It is expected that these deliberations will result in four general outcomes:

a. It is possible to be able to implement an action and there are financial resources immediately available to do so;

b. It is possible to be able to implement an action but there are no immediately available financial resources to do so;

c. It is not possible to implement any action because there is no scope for doing so (e.g. reasonable sound insulation already exists at the affected dwelling, or a noise barrier at its optimum size and location already exists), or there is some overriding technical issue that prevents implementation (e.g. ground conditions do not allow a barrier to be erected); or

d. It is not possible to implement any action because there would be large adverse non-acoustics effects that could not be accommodated by the proposed measure. Such non acoustic effects could include an adverse effect on safety, or a significant adverse air pollution impact, or an unacceptable increase in congestion or journey times.

A second round of assessment plans must be in place by July 2013, and will cover wider areas, subsequently these must be reviewed every five years.

HGVs

Shropshire residents frequently raise concerns about the level of HGV traffic on Shropshire's roads. HGV's are noisier than other motor vehicles and can affect quality of life for people residing in properties near to roads with a heavy flow of HGVs. However, traffic data shown in fig 4.22 suggests that the level of HGV traffic on minor roads has not increased and there has been a reduction in HGV traffic on major roads.

Figure 4.22 % HGV on roads in Shropshire 1999-2009

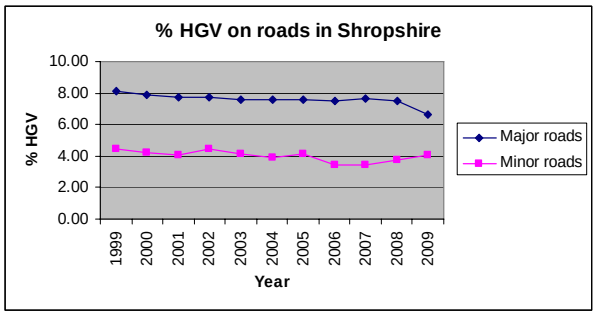
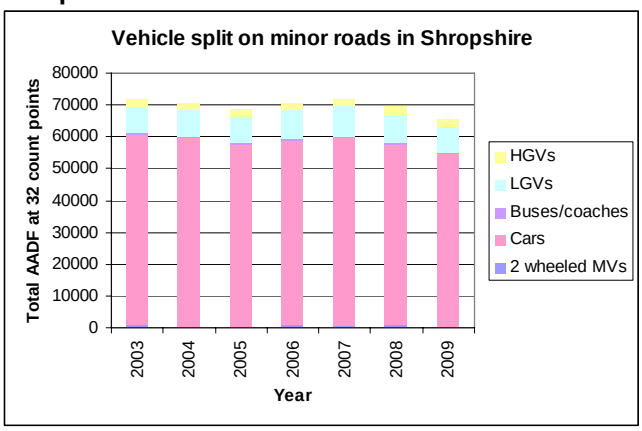


Figure 4.23 Vehicle split on minor roads in Shropshire



4. SWOT analysis

Strengths	**Weaknesses**
• LDF plan to focus development around market towns and key local communities - services closer to people. • Development of virtual access. • The nationally designated landscape of the Shropshire Hills Area of Outstanding Natural Beauty (AONB) covers 23% of the county in the south. • Strong historic and natural environment. Key asset for attracting tourism and stimulating economy. • Good biodiversity.	• The population is projected to grow to 329,600 by 2026. • Rural communities have been affected by the loss of local services such as village shops, post offices, garages and pubs • Flood risk is a key issue in Shropshire and in some areas is a significant constraint to new development. In addition to the River Severn and its tributaries, runoff has increased as agriculture has intensified and we have built more roads and houses, which has degraded the natural permeability of the landscape and reduced its capacity to retain water • Local air quality is also significantly affected by emissions from vehicles. There are five areas in the County declared as Air Quality Management areas, the most significant being an area covering Shrewsbury town centre • Noise from road traffic viewed as greatest noise annoyance.
Opportunities	**Threats**
• Fewer days of frost would mean roads may be less affected by frost and freeze/thaw. • Milder winter temperatures could reduce the need to grit roads. • Warmer weather may increase demand for outdoor leisure and tourism, and encourage active travel. • Encouraging local people to choose locally produced foods would reduce food miles and support local agriculture. • High price of fuel may encourage less use of private vehicle in the short term. • Improved technology offering better choice of more efficient vehicles will reduce CO_2 emissions from transport in future • Reduce CO_2 emissions from street lighting by switching to LED lights.	• Increased risk of heat stress; affecting buildings, roads and railways • Flooding during periods of intense winter rainfall could damage the foundations of roads, railways and runways • Increased risk of storms and flash flooding - would affect access due to road closures • Rapid growth of LGV use, in part due to changes in shopping and delivery patterns. • High petrol prices and demand in the short term will lead to poorer accessibility for those unable to afford price of running private vehicle. • Predicted increase in fuel efficiency in longer term future will make car use cheaper encouraging forecasted traffic growth, journey times and congestion. • Impacts of transport on historic environment including damage to buildings from vehicles and air pollution, visual intrusion by vehicles and loss of bridges due to road widening.

	• Visual intrusion on natural landscape by inappropriate materials and road design, signs and light pollution. • Impact of transport and roads on biodiversity including wildlife road casualties, fragmentation of habitat and spread of invasive species.